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GUATEMALAN GAUZE WEAVES:

A DESCRIPTION AND KEY TO IDENTIFICATION

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Although filmy, lightweight textiles of plain weave are sometimes referred to as "gauzes," this term is more properly applied to a class of crossed-warp weaves in which the warp elements interact with one another in addition to interlacing with the weft elements.[1] In a gauze weave, the warp threads are diverted from their normal positions parallel to one another, and are made to cross and recross each other; the warp crosses are secured by the interlacing of the wefts (see Figs. 16, 29, 31). This characteristic crossing draws groups of warp threads together and pushes the wefts apart. The lacy, open texture generally associated with gauze weaves is created by the wide warp spacing of a balanced or weft-predominant cloth, but in a warp-faced textile the effect is crimped or corded.

Gauze weaves are not as well known as many other fabric structures, but their use is ancient and widespread. The simple nature of the warp interaction makes the development of plain gauzes a logical step on even the least sophisticated loom. Although most gauzes are woven with the aid of special shedding mechanisms which form the warp crosses, these are not essential. Indeed, some of the extraordinary gauze structures produced by the ancient Peruvians were almost certainly executed on "looms" which served only to hold the warp yarns in tension, and incorporated no shedding devices of any sort.

In the Mesoamerican area, where archaeological textiles are lamentably few and far between, the antiquity of gauze weaving is uncertain. The earliest known fragments of gauze construction were recovered from Chametla, Sinaloa (Mexico), dating from approximately A.D. 600–800.[2] However, we may assume that the development of gauze predates this by a considerable time, since general weaving traditions are known to have been well established by the Middle Pre-Classic Period of the Maya (800–600 B.C.).[3] Spanish historians writing about pre-Columbian Mesoamerica mention "lace cloth," "net-like cloth," and even "crossed-work" weaves[4]—any or all of which could indicate gauzes—but without more information the precise character of these techniques cannot be determined.

Textile evidence from the Spanish Colonial era (1524–1821) is even more difficult to find. Although vast quantities of handwoven cloth were shipped from Mexico and Guatemala to Europe, no surviving Mesoamerican textiles have as yet been found which correspond to this period, and shipping and tax records are frustratingly vague. Documentation problems are compounded by the indifference of the historical and descriptive writers of the period who might have furnished written records of Colonial-era textiles.

Information about Guatemalan textiles is generally more available from nineteenth-century sources, but here difficulties arise because of the nature of gauze fabrics. Crossed-warp constructions such as these are not easily recognized or described by the uninitiated, and therefore tend to be overlooked in written discussions of textiles. In artwork and photography, the texture of gauze fabrics is so fine that it is difficult or impossible to differentiate them from fabrics of similar appearance woven in other techniques. As a result, gauze textiles are recognizable in historical sources only by comparison with identifiable style characteristics, a type of analysis which presupposes an existing specimen of the garment. The study of early gauzes, therefore, is limited to the handful of textiles which have survived from the late nineteenth century, and the identification of similar items in historical photographs.

By the early 1930's, a number of writers and ethnographers had begun to document Guatemalan textile traditions. Their work has been invaluable to later researchers, but they were often addressing such a wide spectrum of techniques, materials, styles, and patterns that detailed information on any particular item or group of techniques was likely to be scanty. Nonetheless, the textile collections gathered so painstakingly by the "pioneers" of Guatemalan ethnography—Gustavus Eisen, Samuel K. Lothrop, Lilly de Jongh Osborne, Lila M. O'Neale, the Tulane Expeditions—today constitute the primary source materials for the study of gauze textiles from the first decades of this century. The collecting of Guatemalan textiles has greatly increased since World War II, but gauze techniques continue to be overlooked by most collectors and researchers.

Guatemalan textiles in a number of collections worldwide were surveyed for the present study. Of a total of more than twelve thousand pieces observed by the authors, slightly over two hundred were found to include gauze constructions. These examples were studied in detail, with data recorded on not only the gauze structures themselves, but also the materials and techniques used to produce them. Extensive field studies confirmed and expanded the ethnographic data. The results are presented below. The first section describes the materials and equipment used to produce Guatemalan gauzes, with special emphasis on the modifications made to the normal loom in order to facilitate the formation of the warp crosses. In the second section, the characteristics of gauze fabrics from different geographical regions are discussed. The third and final section presents a detailed analysis of Guatemalan gauze variations; this is designed as a guide for the identification and classification of gauze textiles as well as the description of their production methods. Fig. 40 summarizes technique occurrences in a tabular form.

In Guatemala, gauze techniques are generally referred to as *tejido calado* ("open-work weave") or, less commonly, *tejido renco* ("dislocated-" or "lamed-weave") or *tejido entorchado* ("twisted weave"). These fabrics are still produced in some areas, but the techniques are by no means widespread. They now occur within only two Indian groups, the Kekchí and the Cakchiquel. In each of these cases, crossed-warp techniques are confined to one or at most two types of fabric use, and their popularity is markedly declining.

Guatemalan textile traditions undergo a continuous process of evolution and change, with earlier styles and techniques gradually replaced by more modern versions. Characteristically, older or traditionalist Indians continue producing and wearing earlier styles, while young women adopt the newer ways. Because the outlying hamlets and rural zones are populated by more conservative factions than are the towns themselves, traditional styles may survive longer in these areas, but eventually the last woman who remembers a motif or technique dies and it disappears from local memory.

This is precisely what has happened to gauze techniques in a number of areas. Collected specimens exist, proving that crossed-warp weaves were known in these towns as recently as 1940, but weavers today do not recognize them as techniques from their communities. In other instances, the gauzes may still be woven, but only by a small number of weavers in outlying districts. For the sake of clarity in the following discussion, two terms are used to differentiate between those gauze styles which were once known and those currently being produced (see Fig. 1). Examples of gauze fabrics which are now completely obsolete are referred to as "historical" textiles even if they were woven in this century. Techniques still in use today, by however small a number of weavers, are treated as "current."

MATERIALS AND EQUIPMENT USED TO PRODUCE GAUZES

Thread Types and Treatments

Although a variety of cotton threads has been available to Guatemalan weavers over the years, only five types are found in textiles incorporating gauze weaves. A fine #20 single-ply (Z-spun, of varying degrees of twist), generally known as *hilo corriente* ("normal thread") or simply *hilo*, is by far the most widely used. *Hilo* warp ends may be handled singly, but more commonly are paired; on rare occasion they are tripled. White is the color most often seen in gauze fabrics woven with this thread type, although dark blue was also popular prior to World War II.

A warp sizing must be used to strengthen this unmercerized thread, which otherwise tends to break from the abrasion of the weaving process. In Guatemala the most popular starch bath, called *atolada*, is prepared from corn which has been boiled in slaked lime, drained and ground into a paste, and then reboiled with water added to form a thin gruel. The prepared warp is usually dipped in this hot yellowish mixture just prior to stretching it on the loom bars.

A two-ply mercerized thread, generically referred to as *mish* (the most popular brand name), has become increasingly common for colored gauze textiles in the last two decades. This 16/2 or 20/2 (Z-plied) thread is available in a wide range of colors, and tends to be more colorfast and less susceptible to excessive shrinkage than is the unmercerized *hilo*. *Mish* warp threads require a starch bath when they are handled singly in any weave; in an open, balanced, or weft-predominant fabric this step may occasionally be omitted if the warp ends are combined in pairs.

Some of the historical textiles employ a third thread type, called *retorcido* ("re-twisted"), which is simply two—or occasionally three—strands of *hilo* that have been hand-plied with a Z twist. This process is accomplished using a hand spindle supported in a gourd or clay dish. The unevenness of the twist and its unusual direction (Z-ply of Z-spun threads) create a characteristic crimp, which gives a crepe-like texture to the woven fabric. The advantage of *retorcido* is that it may be woven singly, or in pairs, without any warp sizing, thereby shortening slightly the time spent in loom prepa-

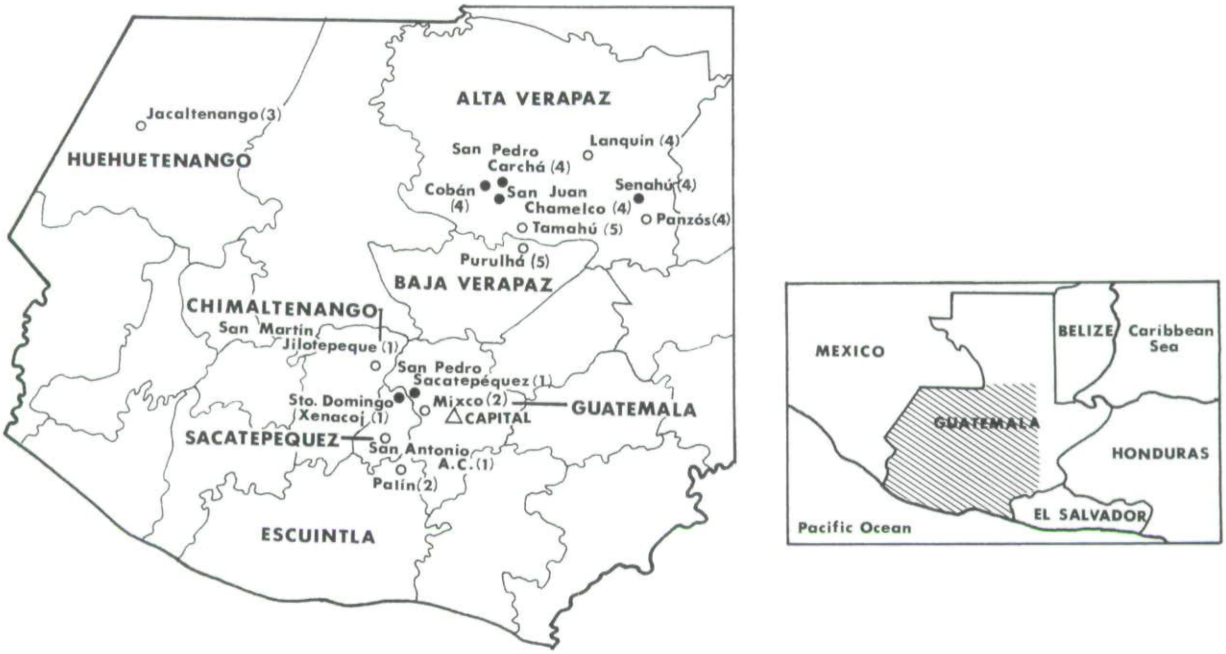


Fig. 1 Guatemalan *municipios* (townships) associated with gauze techniques. The linguistic group of each *municipio* is indicated: (1) Cakchiquel; (2) Central Pocomam; (3) Jacalteca; (4) Kekchí; (5) Pocomchí. Filled circle—gauze weaving currently practiced; empty circle—gauze weaving now obsolete.

ration; however, this is more than offset by the lengthy and tedious process of first combining the two threads and then hand-plying them. (A very strong 20/3 thread with this same advantage has been introduced in the last fifteen years, but it is not used for gauze constructions, probably because of its rather coarse texture.)

Hand-spun single-ply (Z-spun) cotton of varying fineness and degree of twist was used to produce some of the historical textiles. Prior to the last decades of the nineteenth century, when factory-produced threads gradually became available to Guatemalan weavers, all yarns were spun by hand. Today handspinning is practiced in only a very few communities, where it is generally considered an activity for old women rather than an important weaving-related skill.

The other thread type used in gauze constructions is extremely rare and occurs only in a mauve shade. This cord-like cotton yarn is a Z-twist of three plies (which should not be confused with the modern three-ply mentioned above), and was imported from Honduras prior to World War II. Commonly known as *morado falso* ("false purple"), this thread approximated the color of the valued mollusc—*Purpura patula*—purple once available to Guatemalan weavers.

Several thread types are used for the supplementary-weft and embroidery techniques applied to gauze bases. The most common supplementary wefts are the *hilo* mentioned above, or a #8 or #10 single-ply (coarser versions of *hilo*). An imported Chinese silk floss occurs in one ceremonial textile, and two historical examples of embroidery on gauze utilize a thick handspun yarn in the needlework. The supplementary wefts applied to the plain-weave sections of the textiles under consideration are too varied for inclusion here.

Looms and Weaving Processes

Although treadle looms are known and used throughout the Guatemalan Highlands, crossed warp textiles are invariably woven on the Mayan stick loom. Also called the "backstrap," "hipstrap," "waist," "girdle," or "belt" loom, this apparatus is of a simple and functional style (see Fig. 2). Two sticks serve as end beams: one is tied to a sturdy support (e.g., tree or house column), while the second is bound to the weaver's body by means of a strap. Changes in the weaver's position regulate tension on the warp.

Normal shed changes are controlled by two additional sticks: the *shed roll*, which serves as a permanent marker of the first shed opening (odd warps up, even warps down); and a *heddle rod*, which carries thread loops passing under the warps of the countershed (even-numbered warps). Alternate manipulation of these elements serves to open the plain weave sheds. The stick loom is also equipped with one or more *battens* to enlarge the shed opening and beat down each row of weft, a *bobbin* around

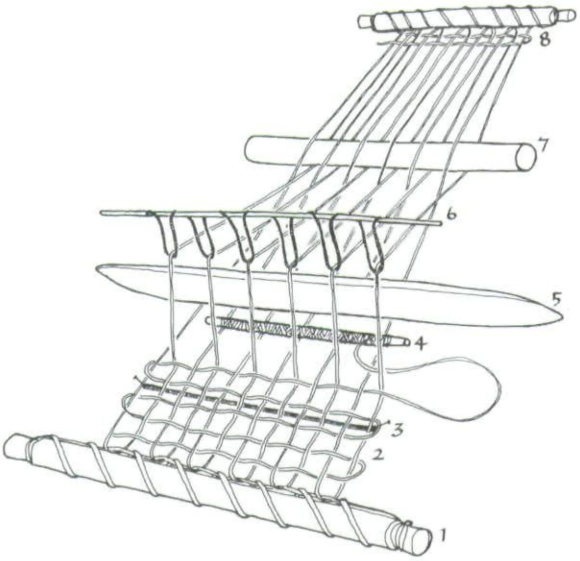


Fig. 2 The Mayan stick loom, set up for plain weave with four web edges. (1) end beam; (2) cloth being woven; (3) tenter; (4) bobbin; (5) batten; (6) heddle rod; (7) shed roll; (8) heading strip; (9) end beam.

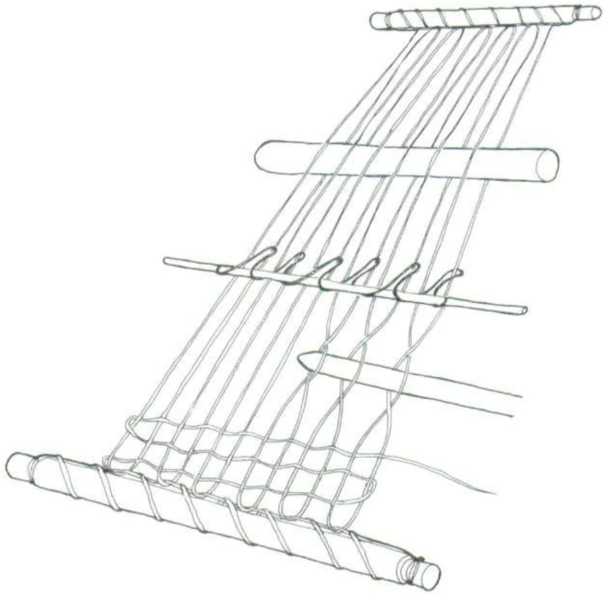


Fig. 3 Plain gauze weaving with no loom modification: picking up the crossed-warp shed by hand onto a pickup sword.

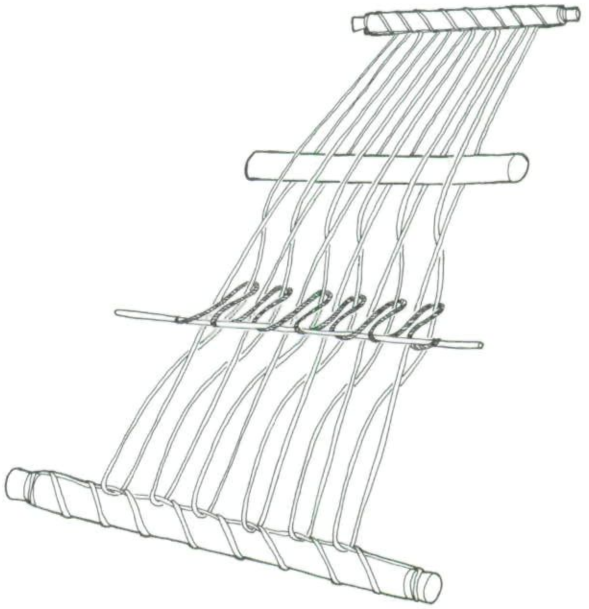
which the weft yarn is wrapped, a *lease stick* to maintain proper warp ordering, and generally a *tenter* to regulate web width (Fig. 2). A wooden or bone needle is sometimes used to straighten the warp threads (see Fig. 11) or to introduce supplementary wefts.

Weavers from different regions use distinct loom arrangements to produce gauzes. The particular type employed depends on local custom (and occasionally individual preference), and reflects the relative amounts of gauze and plain weave, the warp spacing, and the type of threads traditionally used to weave the community style. Most Guatemalan gauze textiles combine selections of gauze with sections woven in plain weave. These are sometimes produced on looms set up for simple plain weave, with no additional modification. When rows of gauze are needed, the crossed-warp sheds are lifted individually by hand onto a *pickup sword* (see Fig. 3).

In contrast, textiles with an allover plain-gauze construction are generally woven on a loom with no normal heddle rod at all.[5] In these cases a special *gauze heddle rod* replaces the plain-weave heddle rod. The heddle loops of the plain-gauze heddle rod are arranged to pull the warp threads of the plain-weave shed under and around their neighbors to form the crossed-warp shed (see Fig. 4). The weaver raises the gauze heddle rod to cross the warp pairs, and then pulls on the shed roll to uncross the warps and return them to their original positions. This weaving sequence—manipulation of the shed roll in alternation with the (gauze) heddle rod—is identical to that used for non-gauze plain weaving. The few rows of plain weave which are woven as a heading strip at either end of the loom (to provide a firm foundation and even spacing as a guide for the gauze cloth) must be handled in a different manner. The countershed for these, which on a normal loom would be lifted by the plain-weave heddle rod, must be picked up by hand.

Those gauze textiles which include major areas in plain weave are more easily woven on looms which include a normal heddle rod. If the fabric is not warp-faced (which would impede the smooth functioning of a gauze

Fig. 4 Modification of the stick loom for allover plain-gauze weaving: the substitution of a gauze heddle rod for the normal plain-weave heddle rod.



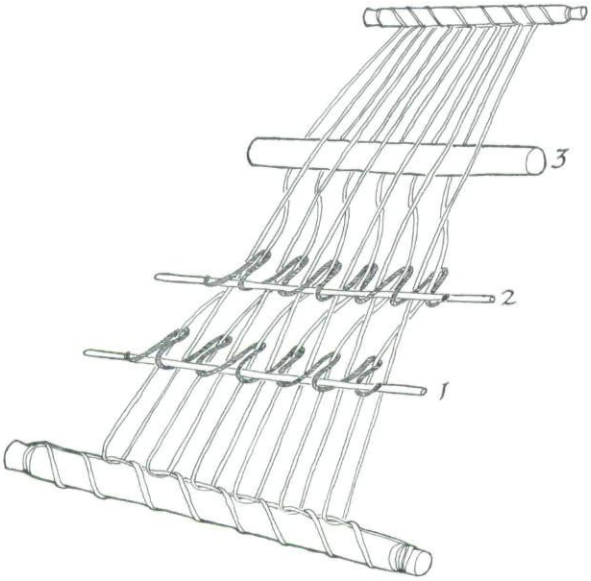


Fig. 5 Normal modification of the stick loom for bands of plain gauze alternating with plain-weave sections: the addition of a secondary (gauze) heddle rod which is used in alternation with the normal heddle rod. (1) plain-weave heddle rod; (2) gauze heddle rod; (3) shed roll.

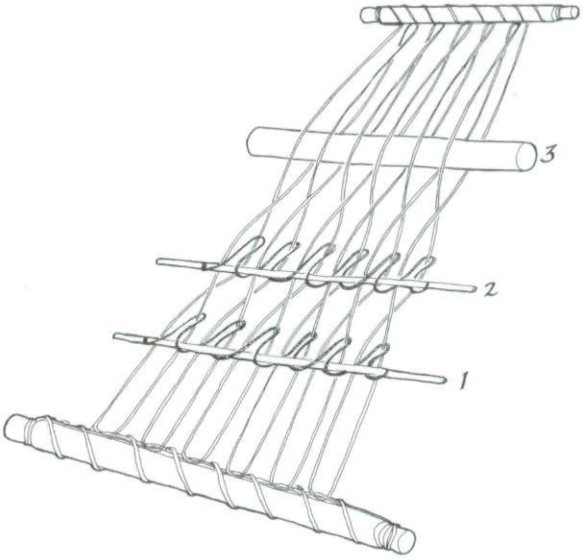


Fig. 6 Less common modification of the stick loom for bands of plain gauze alternating with plain-weave sections: the addition of a secondary (gauze) heddle rod which is used in alternation with the shed roll. (1) plain-weave heddle rod; (2) gauze heddle rod; (3) shed roll.

heddle rod), a second (gauze) heddle rod is normally added to the standard shed roll and heddle rod arrangement.[6]

The shed roll is alternated with the heddle rod to open the plain-weave sheds. For the gauze areas, one of the two warp groups—that opened by the heddle rod (*countershed*) or that controlled by the shed roll (*shed*)—is repositioned to form the warp crosses (compare Figs. 5 and 6). Most Guatemalan weavers prefer to manipulate the countershed (heddle-controlled) threads: the gauze heddle rod lifts each warp of the countershed around and above the neighboring warp of the shed to form the gauze crosses (see Fig. 5). The warps are uncrossed and returned to their normal positions when the plain-weave heddle rod is raised to open the countershed. Almost all Guatemalan plain gauzes are produced in this way, by alternating the gauze shed with the countershed. However, some weavers in Santo Domingo Xenacoj prefer to alternate the gauze shed with the shed. The gauze heddle rod commonly used in this town lifts each warp of the shed around and above the neighboring warp of the countershed (see Fig. 6).

In the countershed/gauze shed sequence most common for textiles which combine bands of gauze and plain weave, the weaver raises the gauze heddle rod only once at the beginning of each gauze section. She then inserts an extra sword into the gauze opening. This functions as a temporary "shed roll" marking the warp crosses of the gauze shed (see Figs. 7–9). It is used in alternate sequence with the normal heddle rod (Fig. 10), thus avoiding the abrasion of the warps which would occur if the gauze heddle rod were repeatedly lifted to cross the warps in every other row of gauze weaving. The even spacing of the warp crosses is maintained by straightening the warps with the fingers or a long needle (see Fig. 11). The temporary shed stick is removed at the end of each gauze section, and weaving returns to the shed/countershed sequence for the plain-weave areas (Figs. 12, 13).

Although it has not been observed in the field, a related sequence is almost certainly used in a few warp-faced constructions for which a gauze heddle rod is impractical. This method also utilizes an extra shed stick, and is similar to the use of "brocading" or "pattern" sticks to mark subsheds in supplementary-weft structures. The weaver picks up the first row of warp crosses in each gauze section by hand onto a pickup sword inserted between the shed roll and the heddle rod. The sword is left in place throughout the weaving of each gauze section and functions as a temporary shed stick in exactly the same manner as that described above. The only difference in the two sequences is that in one case the initial gauze shed is raised with the help of a supplementary heddle rod, while in the other it must be picked up by hand.

Still another loom set-up is used for the production of "checkered" combinations of plain and plain-gauze weaves (see Fig. 21). This

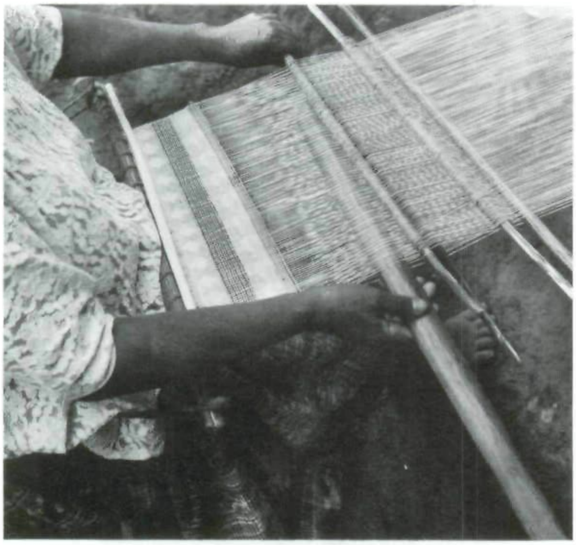


Fig. 7 The weaver has lifted the gauze heddle rod and inserted an extra sword into the gauze-shed opening. This sword serves as a temporary shed stick marking the gauze crosses, and is turned on its side to open the gauze shed. Weaver from San Juan Chamelco. Photograph by Marilyn Anderson.

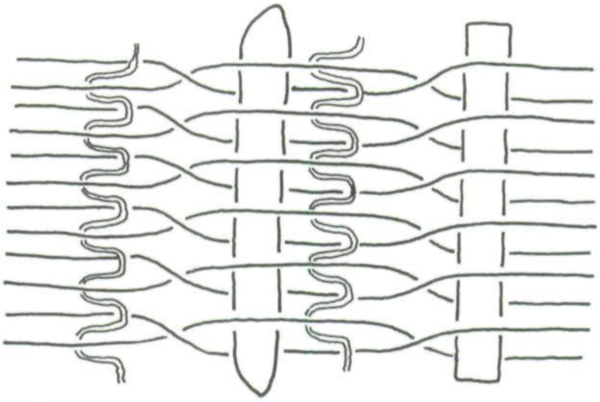


Fig. 8 The temporary shed stick marks the warp crosses made by raising the gauze heddle rod (top view of loom in Fig. 7).

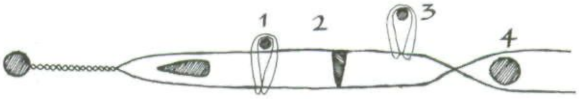


Fig. 9 Positions of the gauze heddle rod and the temporary shed stick during the gauze-weaving sequence (warpwise cross-section of loom in Fig. 7). Compare with Fig. 13.

technique requires the incorporation of two pattern heddle rods, but no normal (plain-weave) heddle rod. The pattern heddle rods control the warp ends in groups of twelve. The first heddle rod lifts half of the first group in plain-weave fashion; crosses half of the second twelve around and above their neighbors in a plain gauze cross; lifts half of the third group; crosses half of the fourth, etc. The second heddle rod reverses the gauze- and plain-weave patterning of the twelve-warp groups. This is accomplished by threading the first pattern heddle rod to lift warps 2, 4, 6, 8, 10, and 12 (and 26, 28, 30, 32, 34, 36; 50, 52, 54, etc.) normally, while pulling warps 13, 15, 17, 19, 21, 23 (and 37, 39, 41, 43, 45, 47; 61, 63, 65, etc.) around and above the neighboring warps of the countershed to form the plain 1/1 gauze crosses. This heddle rod is alternated with the shed roll to weave one series of "squares". The second pattern heddle rod pulls warps 1, 3, 5, etc. around and above their neighbors to form the gauze crosses, while raising warps 14, 16, 18, etc. in normal plain-weave fashion. The

Fig. 10 Gauze weaving alternates the crossed-warp shed, marked by the temporary shed stick, with the countershed (shown here), formed by raising the normal—or plain-weave—heddle rod. Weaver from San Juan Chamelco. Photograph by Marilyn Anderson.

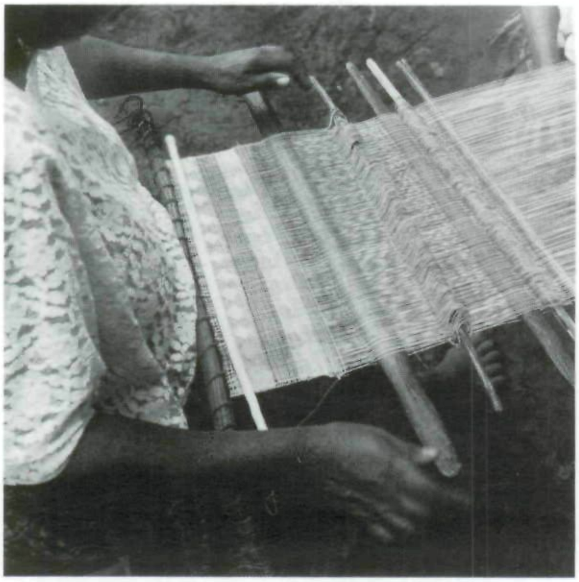
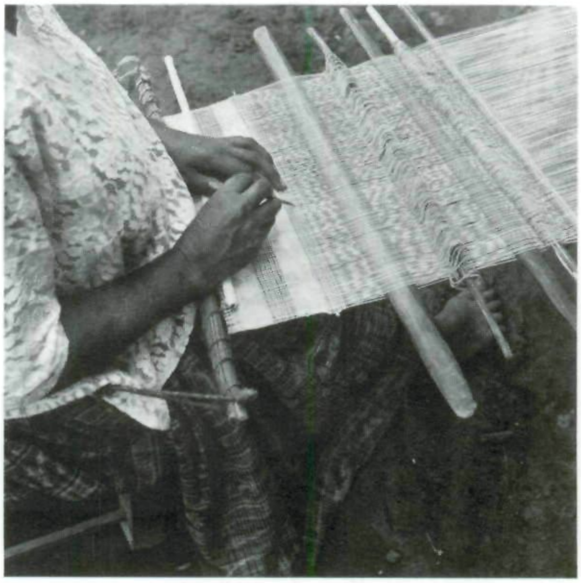


Fig. 11 A bone needle is used to straighten and space the gauze crosses. Weaver from San Juan Chamelco. Photograph by Marilyn Anderson.



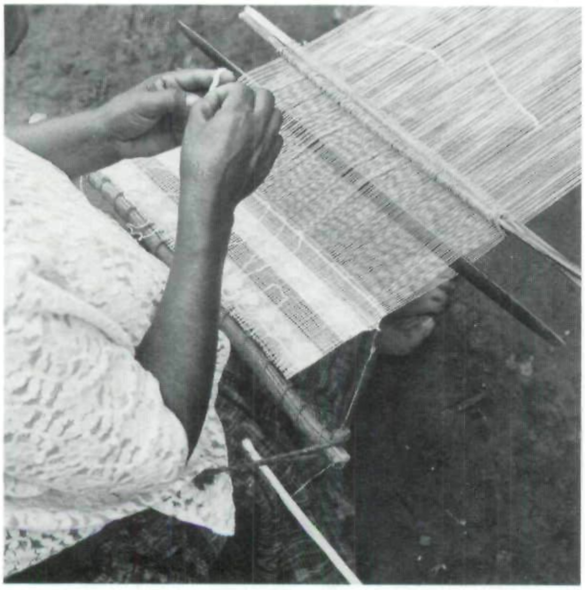


Fig. 12 The temporary shed stick is removed when weaving reverts from gauze to plain weave. Weaver from San Juan Chamelco. Photograph by Marilyn Anderson.

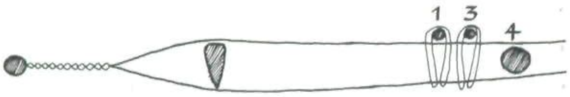


Fig. 13 Position of the gauze heddle rod during the weaving of the plain-weave sections (warpwise cross-section of loom in Fig. 12). The temporary shed stick has been removed; compare with Fig. 9.

shed roll is alternated with this heddle rod to form the alternate series of "squares."

The weaving of complex alternating gauze requires a different type of loom modification, again utilizing two supplementary heddle rods (see Figs. 14, 15). One pulls the first and second warps of the countershed under and around the first and second warps of the shed, and repeats this two-around-two manipulation across the warp (i.e., warps are paired 1-2, 3-4, 5-6, etc., in each layer). The other pulls the second and third warps of the countershed around the second and third warps of the shed (i.e., warp-pairs 2-3, 4-5, 6-7, etc.). The weaver alternates the plain-weave heddle rod with first one and then the other of the gauze heddle rods to weave complex alternating gauze. Four shots are necessary for each gauze sequence: first gauze shed, countershed, second gauze shed, and countershed (see Fig. 29). The heddle loops of the gauze heddle rod closest to the shed roll are threaded to enclose two warps in each loop, which saves some time during loom set-up; but in order to operate smoothly, the lower gauze heddle rod loops must encircle the warps individually (see Fig. 14). Between subsequent weft shots, the weaver pulls on the shed roll to open the plain-weave shed and thus force the warps back into their original (uncrossed) positions. The shed must be opened after each shot to uncross and realign the warps. This precludes the use of a temporary shed stick in the gauze shed to minimize warp abrasion; as a result, stronger warps (generally tripled) must be used for complex gauze than for plain gauze.

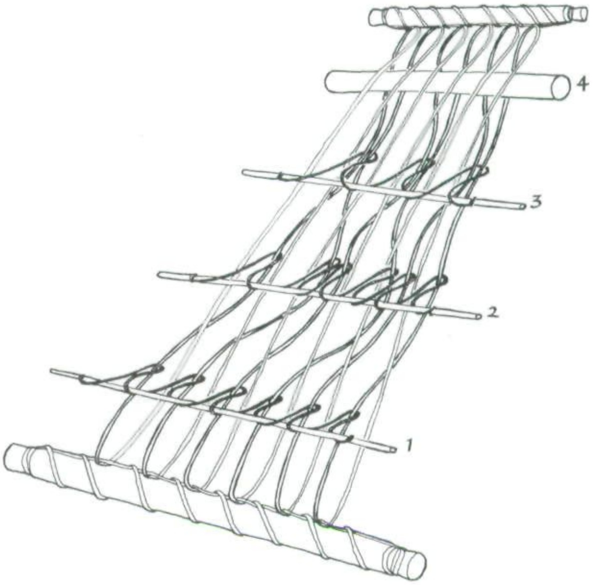
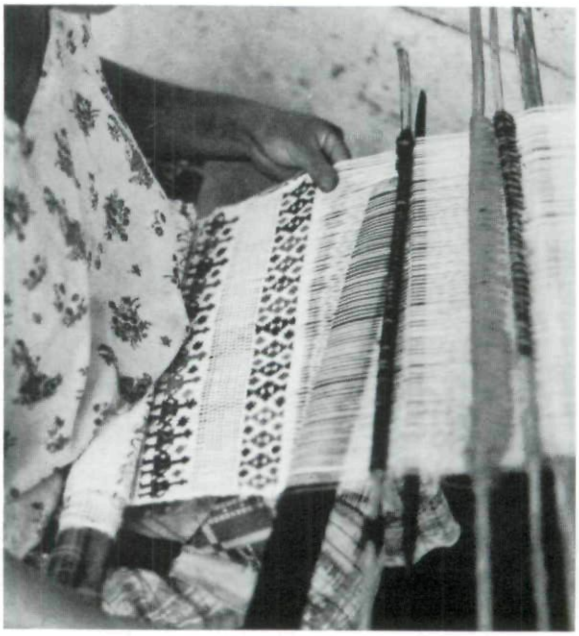


Fig. 14 Modification of the stick loom for complex alternating gauze weaving: the addition of two gauze heddle rods. (1) normal (plain-weave) heddle rod; (2) first gauze heddle rod; (3) second gauze heddle rod; (4) shed roll.

Non-alternating complex gauze (Fig. 31) makes use of exactly the same heddle set-up,

Fig. 15 For complex gauze, the weaver alternates first one and then the other gauze heddle rod with the normal heddle rod. An extra sword is needed to pass the gauze crosses forward through the intervening rows of heddle loops. Weaver from San Pedro Carchá. Photograph by Mike Baizerman.



but changes the order in which the shed openings are made. The weaver uses the two gauze heddle rods one after the other, and then the plain-weave heddle rod. In this case, three shots form the sequence: first gauze shed, second gauze shed, and countershed. As in complex alternating gauze, the weaver straightens and re-orders the warps after each weft insertion by pulling on the shed roll.

CHARACTERISTICS AND GEOGRAPHICAL DISTRIBUTION OF GAUZE TEXTILES

Most Guatemalan gauze textiles are woven to the exact size needed, with no loom waste, by a technique which creates a four-selvedge web. The warp is wound from a continuous length of yarn. The loops at either end of the prepared warp are not simply passed around the end bars—which would leave several centimeters of unwoven warp—but are interwoven by thick heading cords. Each heading cord is bound to an end beam of the loom, and serves as the first row of weft (see Fig. 2). A few inches of cloth are woven as a *heading strip* at one end. The loom is then reversed, and weaving is begun at the opposite end; this continues until the completed web is within about twenty centimeters of the heading strip. At this point, there is no longer enough warp space for the manipulation of the normal shed roll and batten, so the weaver substitutes thinner versions. Eventually the unwoven area narrows until it cannot admit even the slenderest shedding device; the last few rows are individually interlaced with the aid of a needle.

Because the needle-weaving of the closure area is tedious, not all gauze textiles have four selvedges. Nevertheless, virtually all looms are prepared with heading strips. These plain-weave areas are sometimes used simply as a stabilizing element rather than to provide a fourth web edge. In this case, what would be the closure area is left unwoven, and the original heading strip is cut off as loom waste.

Although the general practice is to weave each web separately, two or more small pieces are occasionally woven consecutively in a single loom set-up. In these cases, short lengths of warp are left unwoven between individual sections to serve as a cutting guide or as fringe when the webs are cut apart. This procedure is the exception rather than the rule; textiles in the following discussion should be assumed to have been woven individually, and with four selvedges, unless otherwise indicated.

The principal restriction imposed by the nature of the stick loom is its limitation on web size. Because the weft must be passed from one hand to the other through the shed opening, the width of the fabric must not exceed the span of the weaver's arms. A maximum of approximately 90 cm is theoretically possible, but the shed-changing on so wide a loom requires considerable strength. The great majority of Guatemalan webs measure less than 60 cm in width, and the widest gauze web observed was only 43 cm.

As a result, most Guatemalan garments are necessarily composed of two or more webs joined together to create a wider textile. Since each web is woven individually, no two are ever exactly alike. For the purposes of this study, however, webs which were obviously intended to "match" in the completed garment are treated as identical.

Gauze structures occur in several types of Guatemalan textiles. They are most commonly found in the *huipil*, the woman's loose upper garment characteristic of the Mesoamerican area. *Huipiles* incorporating variants of plain gauze structures are currently produced in four Kekchí villages of Alta Verapaz (Cobán, San Pedro Carchá, San Juan Chamelco, and Senahú). Historically, they also occurred in isolated communities of the Central Pocomam (Mixco), Cakchiquel (San Martín Jilotepeque), Jacalteca (Jacaltenango), and Pocomchí (Purulhá and Tamahú) areas, and the Kekchí village of Lanquín. Complex gauzes appear in modern *huipiles* attributed to three Kekchí towns (Cobán, Senahú, and San Pedro Carchá).

A secondary use of both plain and complex gauze techniques is in the production of *servilletas*, small cloths used to wrap food and ceremonial items such as incense and candles. All known gauze *servilletas* are from the Kekchí area (Cobán, San Juan Chamelco, San Pedro Carchá, and historically, Panzós).

An inconspicuous, closely-spaced plain gauze is occasionally incorporated into *gorras* (also referred to as *monteras*), or babies' caps. The few weavers of Santo Domingo Xenacoj who continue to produce these styles say that the gauze bands "make the caps cooler." All current and historical instances of gauze *gorras* are from the eastern Cakchiquel region (Santo Domingo Xenacoj, San Antonio Aguas Calientes, and San Pedro Sacatepéquez). An identical use of plain gauze is found in two *tapetes* (ceremonial cloths) from Santo Domingo Xenacoj and San Pedro Sacatepéquez. Full-turn gauze occurs in the "fringe" of a historical *bufanda* (ceremonial neck-scarf) from the Central Pocomam community of Palín.

A special mention must be made of the Kekchí communities of the Alta Verapaz. This region is justly famous for its diaphanous gauze textiles—and is often believed to be the only area in which gauze techniques are still practiced. *Huipiles* and *servilletas* from Alta Verapaz do account for the vast majority of gauze textiles available today. They are also the most readily identifiable as gauzes, since the few Cakchiquel examples are so closely spaced as to appear twined (see Fig. 26). However, the Alta Verapaz region presents a special difficulty with regard to textile identification. Guatemalan garments are normally classified as being from a particular Indian community, since each village traditionally has its own distinctive dress. In the case of Alta Verapaz, the last seven decades have witnessed an amalgamation of community styles into a generalized regional style. Cobán, capital of Alta Verapaz and the major market town of the district, is often mentioned indiscriminately as the specific source of all regional variations, both historical and contemporary. In fact, most of the gauze fabrics sold and worn throughout the region today are woven in the outlying districts of San Juan Chamelco and the Sierra de Chamá (mountainous area north of Cobán), and can only be identified as belonging generally to the Kekchí region.

Nevertheless, certain subgroups of the "Cobán" or Alta Verapaz style can be considered to be more representative of some villages than of others. White-on-white plain-gauze/plain-weave combinations are most commonly attributed to Cobán or San Juan Chamelco; similar styles patterned with colored design motifs are likely to be from San Pedro Carchá. In Senahú, complex-gauze/plain-weave combinations occur most frequently with colored patterning on a white ground, while related styles from San Pedro Carchá often utilize a colored ground (however, both of these complex gauze types are also worn in Cobán). Whereas gauzes from other areas are attributed to specific communities in the following discussion, these pan-regional styles are simply identified as being from "the Alta Verapaz region."

OUTLINE OF GUATEMALAN GAUZE TEXTILES

The descriptions presented below are of a comparative nature to facilitate the identification of individual gauze textiles. Each major structural type—plain gauze, complex gauze, supplementary-weft patterned gauze, embroidery over gauze cloth, and full-turn gauze—is subdivided according to the way in which the gauze-work is used in the fabric. Within each subgroup, regional or local variations are individually treated in the order of their quantitative predominance in the collections studied. To identify a gauze fabric, the reader should first refer to the figures in order to determine the cloth's basic structure, and then utilize the text descriptions as a key to compare the item with other similar variants. Once the piece has been identified as being of a particular category, its community of origin and the method used to produce it can be documented from the textual information.

Unique examples and textiles appearing in the illustrations are cited by the institutional or private collections to which they belong,[8] and their individual registration or catalog numbers. Where appropriate, the reader is referred to other publications which include illustrations of Guatemalan gauze textiles.

For purposes of comparison, fabric "weight," or firmness, is specified in each case. The examples range from "extremely lightweight" (almost completely transparent) to "medium heavyweight" (very firm and approximately 1–1.5 mm thick). Specific thread counts are not included, since they were found to vary considerably from one item to another as well as within each piece, and therefore have little value for comparative purposes.

Warp/weft balance is also specified for all pieces with plain-weave sections, and constitutes one of the most valuable identifiers for Guatemalan gauzes. The texture of gauze structures changes dramatically according to the spacing and size of warp and weft elements (compare Figs. 16, 17, 25, 26, 27, 28). Gauzes with widely-spaced warps are lace-like and filmy, while their firmer counterparts resemble warp-twining or fine crocheting.[9] It is, in fact, the inconspicuous nature of closely-spaced warp crosses (e.g., Figs. 26 and 28) which probably accounts for the omission of some gauze types from most collections and descriptive publications.

1. Plain Gauze (Figs. 16 through 28)

In plain 1/1 gauze structures, each warp crosses over or under the warp adjacent to it, is held in place by a shot of weft, and then recrosses back to its original position (Fig. 16). Wefts pass over one warp and under the next in a regular 1/1 interlacing. Warps interwork in pairs; one consistently passes under its counterpart and over the weft, while the next passes over the first warp and under the weft. Both

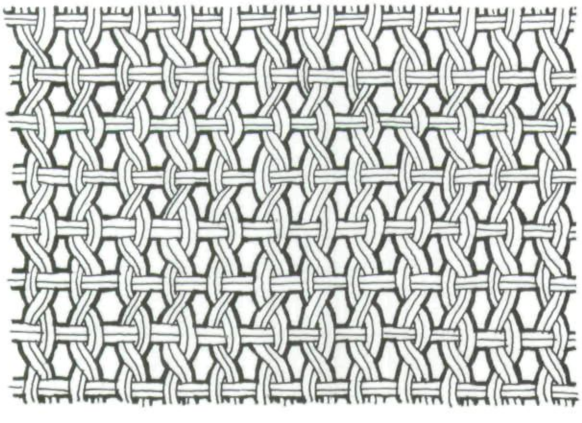


Fig. 16 Plain 1/1 gauze weave, with spaced warp ends.

the warp crosses and the points at which the warps are secured by wefts are in vertical alignment.

Plain gauze appears in a variety of ways in Guatemalan textiles: as single shots alternating with plain or supplementary-weft patterned weaves, in a checker with plain weave, in bands alternating with plain weave and various supplementary-weft patterned weaves, and as an overall fabric structure. Each of these variations is treated individually below.

1.1. SINGLE SHOTS OF GAUZE ALTERNATING WITH PLAIN WEAVE (Figs. 18, 19). Gauze shots form open horizontal "stripes" at regular intervals along a balanced fabric of white *hilo* (paired in both warp and weft) in a medium-light weight. This style is the simplest gauze *huipil* used in the Alta Verapaz region, and like the others from this area is composed of three equal-size rectangular webs. The gauze shots are alternated with three, five, or seven rows of plain weave (see Fig. 19). None of the three versions is particularly common, but all are currently produced. This type of *huipil* is also reported to have been woven historically in the town of Lanquín.[10]

The fabric is woven on either an unmodified stick loom (with the gauze sheds picked up by

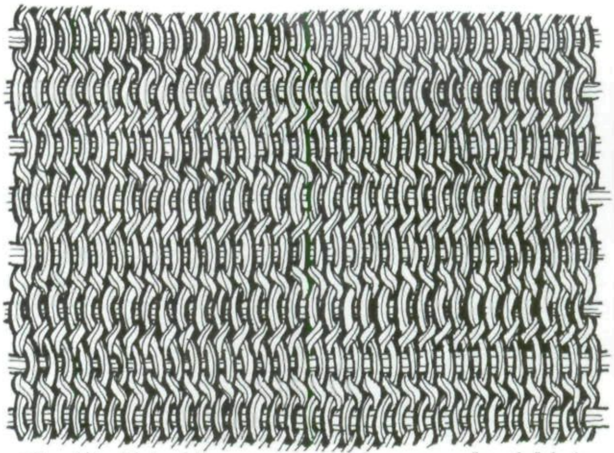


Fig. 17 Plain 1/1 gauze weave, in a warp-faced fabric.

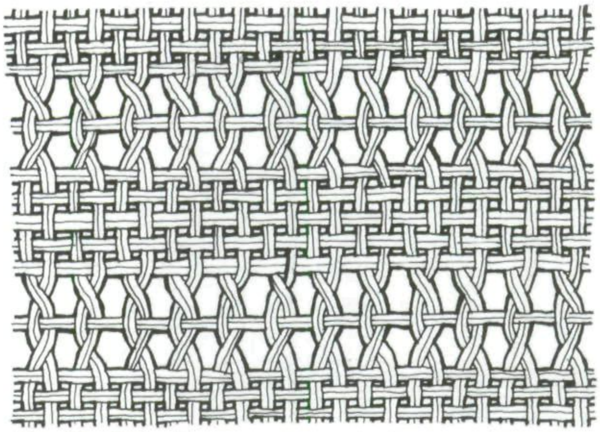
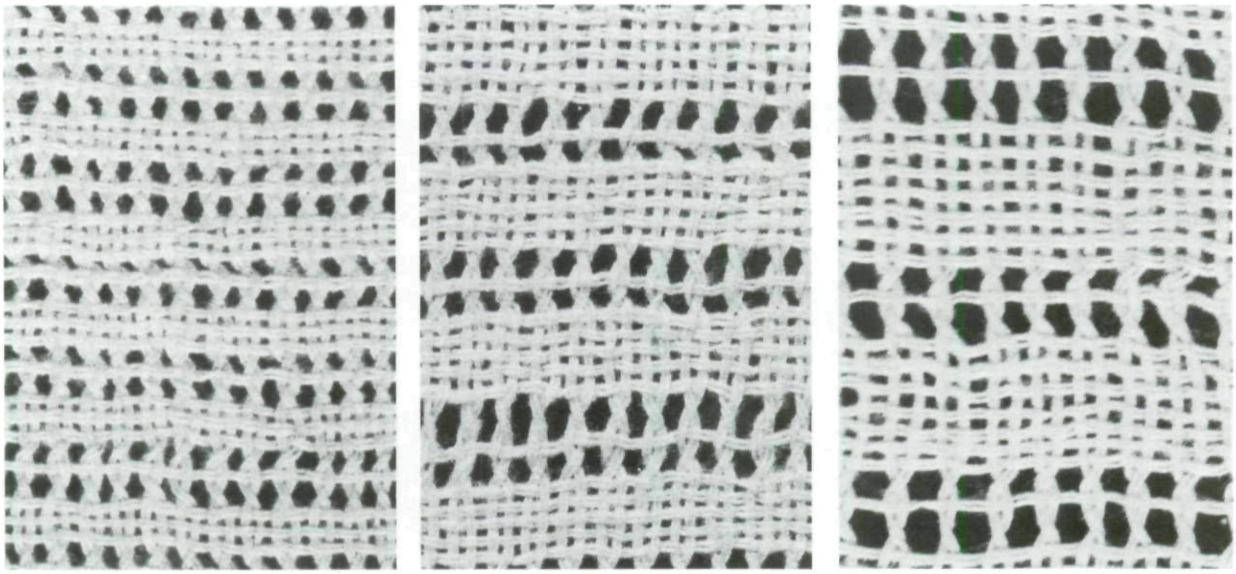


Fig. 18 Plain 1/1 gauze weave, single gauze shots alternating with sections of plain weave.

Fig. 19 Single gauze shots alternating with varying amounts of plain weave: (left to right) three shots, five shots, and seven shots of plain weave. *Huipiles*, Alta Verapaz region (IXCHEL 482, Hempstead 5, Hempstead 6).



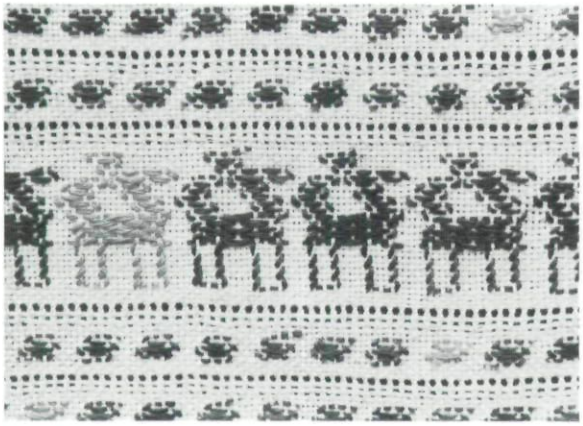


Fig. 20 Plain 1/1 gauze weave, single gauze shots alternating with sections of plain weave patterned with supplementary wefts. *Huipil*, San Pedro Carchá (Hempstead 9).

hand) or one equipped with a gauze heddle rod. The normal weaving sequence is: (1) two, four, or six rows of plain weave, ending with the shed; (2) countershed; (3) gauze shed.

1.2. SINGLE SHOTS OF GAUZE ALTERNATING WITH SUPPLEMENTARY-WEFT PATTERNED PLAIN WEAVE (Fig. 20). Gauze shots again form regular horizontal "stripes," but in this case the intervening sections of plain weave have weft-float patterns. White *hilo* was tripled in both warp and weft of this balanced, medium-lightweight fabric. The gauze shots alternate with 1.5–4 cm of plain weave, and each plain-weave section was patterned with one row of multicolor motifs. The single observed specimen of this type (Hempstead 9) is a *huipil* from the Alta Verapaz region, collected in the early 1960's (Fig. 20).

Although in the finished textile there is no direct evidence of the weaving sequence, it is probable that the infrequent gauze sheds were picked up by hand. A count of wefts from the lower heading strip indicates that the gauze sheds were probably alternated with the shed, rather than the countershed (as is more generally seen in Alta Verapaz gauzes). The weaving sequence would have been: (1) four or more rows of plain weave, ending with the shed; (2) gauze shed, picked up by hand; (3) seven or more rows of plain weave, beginning and ending with the shed; the last two steps were repeated as necessary.

The supplementary-weft patterning of the plain-weave segments was created with the following sequence: (1) one or three rows of plain weave, ending with the shed; (2) countershed, with the ends of the extra wefts laid in for anchorage; (3) shed, with the extra wefts carried freely across the motif areas in 3- or 5-span floats anchored under single warp ends; (4) countershed, with the extra wefts turned on the face of the cloth and again carried in floats; steps 3 and 4 were repeated as necessary to form the motifs, and were then followed by a shot with the ends of the supplementary wefts laid in, then one to three more rows of plain weave. At the edges of very narrow motif areas, such as the legs of animal figures, the wefts were passed to the reverse of the cloth in a wrapping motion. The design motifs include simple or serrate lozenges and animal figures. A single motif is repeated across each horizontal row.

1.3. PLAIN GAUZE IN CHECKER WITH PLAIN WEAVE (Figs. 21, 22). The open spacing of balanced plain weave contrasts with the lacy texture of plain gauze in a checkerboard pattern (see Fig. 22). The semi-sheer and lightweight fabric is woven of white *hilo* (paired in both warp and weft), and individual "squares" are twelve warps wide and six or eight shots long. Three identical four-selvedge webs are joined lengthwise to form this infrequent *huipil* style from the Alta Verapaz region.[11]

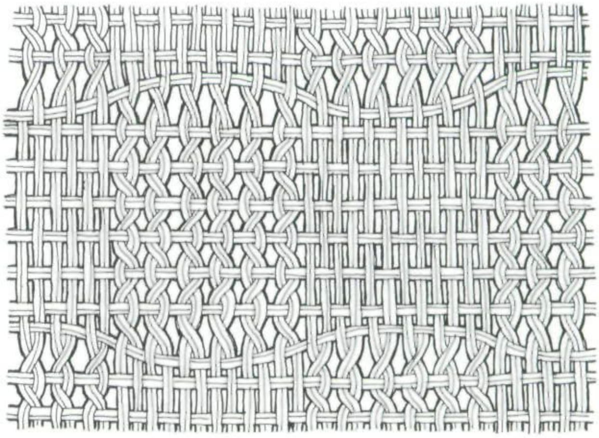


Fig. 21 Plain 1/1 gauze weave, in checkered pattern with plain weave.

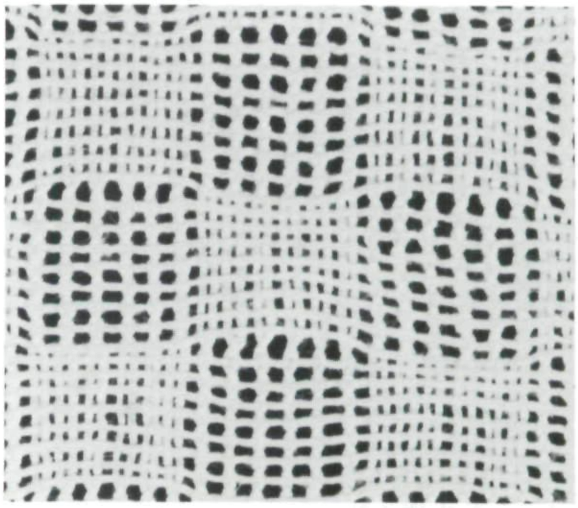


Fig. 22 Plain 1/1 gauze weave, in checkered pattern with plain weave. *Huipil*, Alta Verapaz region (Stewart 5).

This particular combination of plain weave and gauze weave requires two separate pattern heddle rods. Although the weaving sequence has not been observed, the pattern heddle rods are almost certainly used in alternation with the shed roll, obviating the use of a normal (plain-weave) heddle rod in all but the plain-weave heading strips. The first pattern heddle rod controls the warp ends for one row of "squares": the first twelve warp pairs are opened in normal plain-weave fashion; the second twelve are crossed in pairs to form a 1/1 plain gauze; the third opened in plain weave, and so on. The second pattern heddle rod controls the opposite set of warp ends, reversing the arrangement of gauze crosses and plain weave so that the pattern emerges as a "checkerboard." The weaving sequence would be: (1) six or eight shots of shed alternated with the first pattern shed; (2) six or eight shots of shed alternated with the second pattern shed. It should be noted that this technique is in contrast to the more popular Guatemalan gauze sequences because it alternates the crossed-warp shed with the shed rather than with the countershed.

1.4. PLAIN GAUZE IN BANDS ALTERNATING WITH PLAIN WEAVE (Fig. 23). This variant presents a very obvious "striped" appearance, due again to the dramatic change in texture from the plain-weave to the gauze sections (see Fig. 23). These lightweight textiles are woven of white *hilo*; the weave is almost balanced when both warps and wefts are paired, but is definitely weft-predominant when only the wefts are paired. The gauze sections may be either three or five shots in length, while the plain-weave areas are generally slightly larger. The textiles are an unusual variation of the *huipil* styles from the Alta Verapaz region.

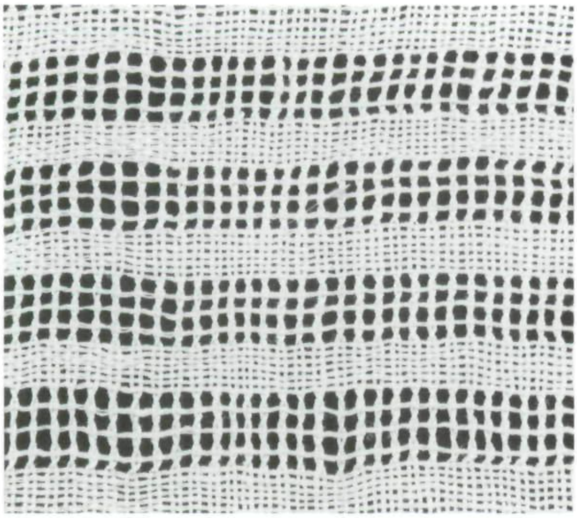


Fig. 23 Plain 1/1 gauze weave, in bands alternating with plain weave. *Huipil*, Alta Verapaz region (Hempstead 7).

These pieces are woven on looms equipped with a supplementary heddle rod. The weaving sequence is: (1) five or seven rows of plain weave, ending with countershed; (2) gauze heddle rod raised and temporary shed stick inserted to mark the warp crosses before the gauze shed is woven; (3) countershed; (4) gauze shed (picked up from the temporary shed stick); steps 3 and 4 are repeated once or twice more. The temporary shed stick is then removed before weaving the next plain-weave section.

1.5. PLAIN GAUZE IN BANDS ALTERNATING WITH SUPPLEMENTARY-WEFT TECHNIQUES (Figs. 24, 25, 26, 27, 28). Five distinct groups of textiles are woven with this type of patterning. The first includes lightweight or medium-lightweight fabrics which incorporate laid-in or single-faced[12] weft-float patterns in the plain-weave bands. The second group is of medium-heavyweight textiles utilizing two-faced or single-faced supplementary-weft patterning. Medium-weight cloths incorporating double-faced patterning form the third group. The fourth includes medium-weight cloths with two-faced patterning. The fifth type is a medium-heavyweight textile with small supplementary-weft "knots." Each of these structures is treated separately.

1.5.1. In these lightweight textiles, gauze sections form lacy openwork bands between areas decorated with laid-in or weft-float patterning. *Hilo* is used singly or paired in these fabrics, which are usually balanced or slightly warp-predominant in the plain-weave sections. A 1/1 thread use results in a lightweight texture, while 2/2 pairing or 3/3 tripling create a medium-lightweight cloth. The gauze areas vary in length from five to thirty-five shots; the intervening plain-weave sections measure 1.5–9 cm. Patterning is executed in white-on-white laid-in "shadow weave," or with white or colored supplementary-weft floats against a white ground.

The varied styles of this group are by far the most common gauze textiles in Guatemala, both historically and at the present time. The construction correspondingly accounts for the majority of gauze *huipiles* and *servilletas* in collections worldwide. All examples of this type were woven in the Alta Verapaz region or in the nearby Pocomchí village of Purulhá; the technique has also been attributed to Tamahú.[13] Fabrics composed of three webs were produced to serve as *huipiles*. Single long and narrow webs with four selvedges are *huipil* sections, while shorter and squarer webs, usually fringed, are *servilletas*.

Looms for this type of textile incorporate a supplementary heddle rod for the gauze sections. The weaving sequence is as follows: (1) countershed; (2) raise gauze heddle rod and insert a sword to temporarily mark the warp crosses, then weave gauze shed; (3) countershed; (4) gauze shed picked up from the temporary (gauze) shed stick; (5) countershed. For longer gauze segments, 4 and 5 are repeated. The temporary shed stick is removed before starting the plain-weave sections. This sequence, as practiced by a weaver from San Juan Chamelco, is shown in Figures 7 through 12.

Extra-weft patterning appears as a single design row in each plain-weave section, and generally only one motif is used per row. The supplementary wefts are handled in multiples (usually three or four heavy threads together) to enhance the textural contrast of the design motifs. The extra wefts are applied in one of two techniques: laid-in or weft-float patterning.[14] A single example (M.NAC.50359) combines both techniques in some motif rows.

In the first technique (see Fig. 24), discontinuous supplementary wefts are laid into every other row of ground weave. Between pattern shots the decorative threads float vertically over the face of the fabric, and in some cases the weaver plucks them with a finger or needle to create a looped effect at motif edges, where they re-enter the ground weave. Except for the edge loops, motifs appear the same on both faces of the cloth. The most common weaving sequence for these sections is: (1) one or more shots of plain weave, ending with shed; (2) the extra wefts are introduced into the countershed to begin a row of motifs; (3) shed (the supplementary wefts are not laid into the shed, but are left hanging down over the portion already woven); (4) countershed, with the supplementary weft ends brought back up and laid in across the motif areas (edge loops are formed at this point). Steps 3 and 4 are repeated to form the patterned sections, which end with one or more undecorated shots. In some textiles the pattern wefts are laid into every row of ground weft, shed and countershed alike. This heavier use of decorative thread is generally confined to 2/2 plain weaves, and compensates for the fact that the denser weave tends to obscure motif outlines.

The second type of supplementary-weft patterning is woven in white-on-white in some *huipiles* from the pre-1950 era and occasional modern fabrics; however, it appears much more commonly as colored wefts against a white ground (see Fig. 25). The discontinuous extra wefts are freely floated across the surface of the plain-weave areas. The decorative threads cross and recross the motif areas with subsequent shots of ground weft, resulting in well-defined motifs on one face of the fabric. Since the extra wefts are carried across this same face between rows, no patterning shows on the reverse; however, because the ground weave is balanced, extra wefts of a contrasting color do appear in colored flecks on the reverse. The usual weaving sequence is: (1) one or more rows of plain weave, ending with the shed; (2) countershed, with the ends of the extra wefts laid in for anchorage; (3) shed, with the extra wefts carried all the way across each motif area, then passed under a single warp or warp-pair; (4) countershed, with the extra wefts turned on the face of the cloth and passed across the motif area; 3 and 4 are repeated as necessary. When float spans become too long (for example, across the center of a lozenge), they are anchored as necessary under additional warp ends. When the motif area is too narrow to accommodate a looped edge, the extra weft is simply carried across the design area and brought back

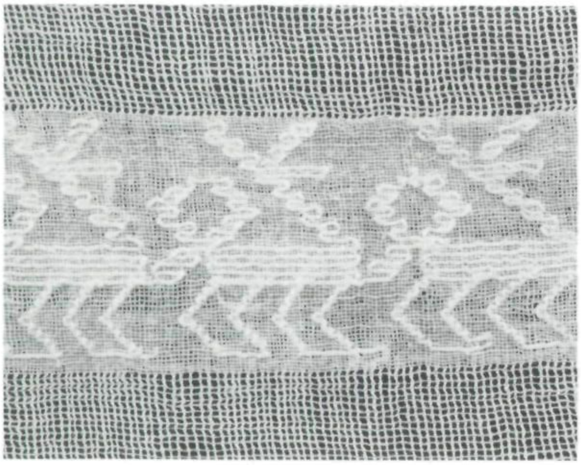


Fig. 24 Plain 1/1 gauze weave, in bands alternating with sections of plain weave patterned with laid-in supplementary wefts. *Huipil*, San Juan Chamelco (IXCHEL P–179).

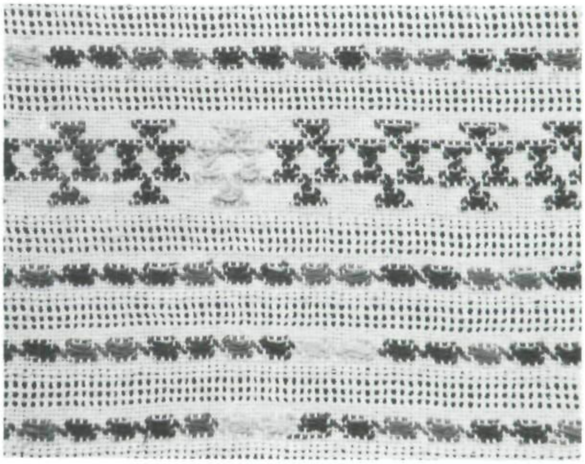


Fig. 25 Plain 1/1 gauze weave, in bands alternating with sections of plain weave patterned with supplementary-weft floats. *Huipil*, Alta Verapaz region (Hempstead 8).

under the last warp end passed in a wrapping motion. In the final shot of the pattern, the ends of the supplementary wefts are laid into the ground shed to keep them from unraveling.

Popular design motifs include lozenges, horizontal zigzags, chevrons, tobacco plants, birds, dogs, horses, and human figures. Most *huipiles* of this type are now woven with all three webs of the same size and style of patterning. However, examples from the early part of the century tend to have different and deeper design bands across the central web, while patterning on the two outer webs is simpler and spaced by wider sections of gauze;[15] this design placement may also be found on a few currently produced *huipiles*.

1.5.2. Heavier fabrics combine gauze areas with plain-weave sections patterned in two-faced or single-faced designs. Because of the warp-predominance of these fabrics, the gauze sections appear as crimped areas with the general texture of crocheting (see Figs. 17, 26), rather than the lacy, open texture normally associated with gauze constructions. *Mish* or *hilo retorcido* is paired to form a warp of multicolor stripes in these medium-heavyweight textiles. The ground wefts are either two strands of *mish* or four of *hilo*. Gauze sections vary from 2.5 to 9 cm in length, while the plain-weave areas measure 2–11 cm. The long, narrow webs have four or—in cases where two pieces were woven consecutively on the same loom and later cut apart—three selvedges, and are *gorras* from Santo Domingo Xenacoj (Fig. 26), or infrequently from San Pedro Sacatepéquez. They are still being produced, although in diminishing quantity during the last decade. Two *tapetes* utilizing similar patterning have been observed; one is from Santo Domingo Xenacoj (Elmenhorst 134–18–17), the other from San Pedro Sacatepéquez (IXCHEL 730).

These textiles are woven with the gauze shed either picked up by hand or raised by a supplementary heddle rod. Field studies in Santo Domingo indicate that the selection by a weaver of one method or the other seems to be largely a matter of personal preference. The weaving sequence is the same in either case: (1) shed; (2) gauze shed; (3) shed; 2 and 3 are repeated as necessary. Note that in this case the gauze shed alternates with the shed, rather than the countershed, and that therefore a temporary shed stick may not be used to mark the gauze crosses. However, it is likely that Santo Domingo weavers who produce warp-faced pieces employ a temporary shed stick to mark the warp crosses during the gauze sequences; in these cases the gauze shed is alternated with the countershed rather than the shed.

Supplementary-weft patterning is introduced in one of two ways: (*a*) In the most common technique, discontinuous extra wefts float across the front in motif areas, passing through the entire web to float across the back when not needed to form the design; in some motifs, each weft float may be plucked with the fingers to raise it above the ground-fabric surface, resulting in a slight surface pile. (*b*) In another, rarer technique, the discontinuous extra wefts are floated only across the front, and are held in place by warp pairs which themselves form a subordinate pattern; at the edge of each motif, the extra-weft ends are turned back on the same face, creating a looped edge effect. The first technique results in a two-faced pattern, while the second creates a single-faced design.

Common motifs include complex birds and animals, serrate zigzags and bundles, and stylized floral-like figures, as well as some simpler

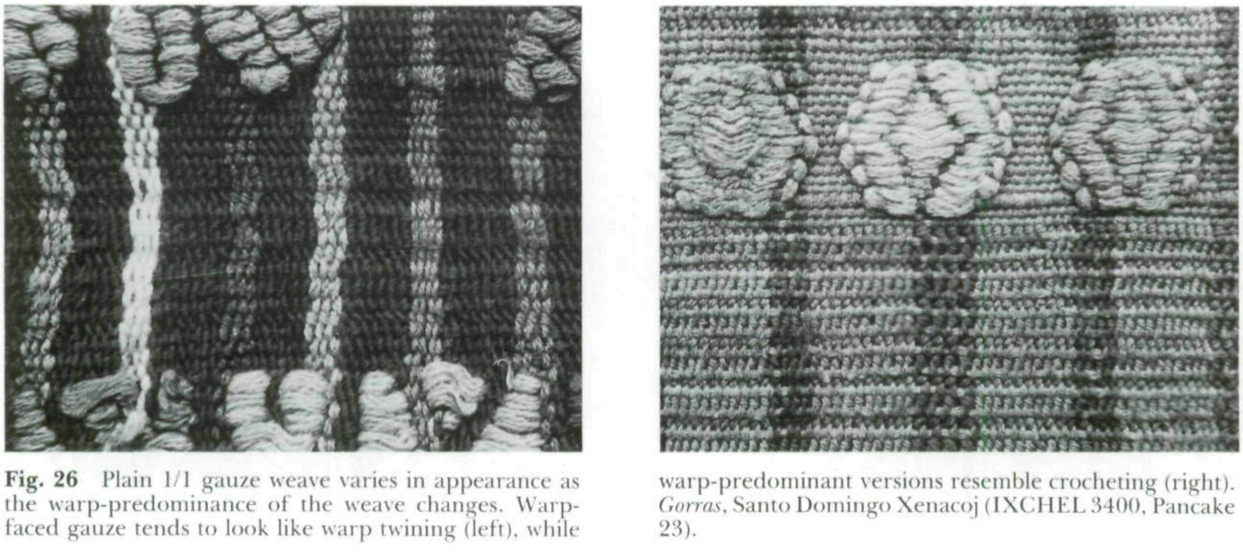


Fig. 26 Plain 1/1 gauze weave varies in appearance as the warp-predominance of the weave changes. Warp-faced gauze tends to look like warp twining (left), while warp-predominant versions resemble crocheting (right). *Gorras*, Santo Domingo Xenacoj (IXCHEL 3400, Pancake 23).

geometric forms. Individual rows generally include only one or at most two motifs, although coloring changes across the row.

The *gorras* from Santo Domingo Xenacoj and the few identical modern pieces from San Pedro Sacatepéquez are very similar to those historical examples attributed to San Pedro prior to World War II (described under 1.5.4. below). Generally speaking, the modern specimens are more often from Santo Domingo; are of a heavier weight and are more likely to be warp-predominant; use *mish* rather than *hilo* for the warp; incorporate more color both in the ground fabric and in the supplementary-weft patterning; usually have broad selvedge-stripes; and use more numerous as well as more complex figures in the extra-weft patterning.

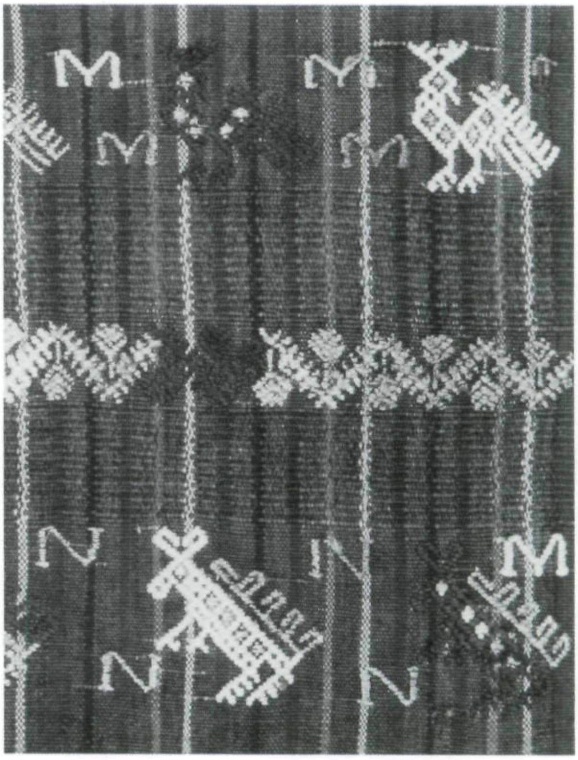
1.5.3. Double-faced patterning (on rare occasion combined with two-faced motifs) decorates the plain-weave sections of some dark blue textiles. *Hilo* or *hilo retorcido* is used in pairs for these medium-weight cloths, which are balanced to slightly warp-predominant in the plain-weave segments. Fifteen to twenty-one shots of gauze are alternated with 3–9 cm sections of plain weave. Patterning is introduced by thick silk and/or cotton weft stripes in the plain-weave, and occasionally also the gauze, sections; similar extra wefts are used to form horizontal rows of single motifs. The long, narrow webs were regularly woven as *gorras*[16] in San Antonio Aguas Calientes prior to the Second World War. None have been woven within recent years, but the style is still recognized by some local weavers.

Discussions with San Antonio weavers indicate that textiles of this sort were probably woven on both unmodified looms and those incorporating supplementary heddle rods. The weaving sequence would have been: (1) countershed; (2) gauze shed, picked up by hand or raised by the gauze heddle rod; (3) countershed; 2 and 3 repeated as necessary. In some of the *gorras*, thick wefts of *morado falso* take the place of the fine dark blue wefts in two or more subsequent shots.

Similar weft stripes are found in the plain-weave sections. Extra wefts are added in several ways, described here in order of frequency: (*a*)"Figure-8" style weft floats form a reversible or double-faced image, in which the discontinuous extra wefts pass over, then under subsequent groups of two or four warp pairs across the motif area, then reverse direction in the same shot of ground weft so that all warp groups are covered on both faces. (*b*) Continuous extra wefts are wrapped horizontally, generally passing over two or three warp pairs, then back under one. (*c*) Discontinuous extra wefts are wrapped vertically or diagonally in subsequent shots of ground weft. (Techniques *b* and *c* are not structurally identical on the two faces since floats are longer on the front, where they resemble embroidered stemstitch, than on the back, where they are similar in appearance to backstitch; but the design formed is similar.) (*d*) Continuous decorative wefts are used to form a two-faced patterning, with the extra wefts floating across the back when not needed to form the design on the front. All of these techniques are carried out on a closed shed, and two or more are often combined in a single motif. The designs themselves are so varied and complex that no attempt will be made to describe them here; the techniques alone are sufficient to distinguish these textiles from the other styles under consideration.

1.5.4. Other medium-weight styles utilize two-faced supplementary-weft patterning. These long and narrow single webs are woven of *hilo* (paired in the warp and paired or quadrupled in the weft), and are balanced or slightly warp-predominant in the plain-weave sections. The ground fabric is dark blue or white (the latter with occasional warpwise and weftwise stripes). The gauze areas measure from thirteen to nineteen shots; plain-weave sections are longer, measuring 4–18 cm. A horizontal row of single motifs patterns each plain-weave section; supplemen-

Fig. 27 Plain 1/1 gauze weave, in bands alternating with sections of plain weave with two-faced supplementary-weft patterning. *Gorra*, San Pedro Sacatepéquez (TM 1964.65.98). Photograph by Joel Breger.



tary wefts may be continuous or discontinuous, but the overall effect is fairly light. Textiles of this sort are historical examples from the pre-World War II era, and are *gorras* attributed to San Pedro Sacatepéquez (see Fig. 27).[17]

Occasional inconsistencies in the warp crosses suggest that the gauze sheds were picked up individually by hand rather than with the aid of a supplementary heddle rod or a temporary shed stick. It is not certain whether the gauze shed was alternated with the shed or the countershed, but the former seems more likely in view of current production methods. The weaving sequence for the gauze sections would have been: (1) shed; (2) hand pickup of gauze shed; (3) shed; 2 and 3 repeated as necessary. The two-faced patterning of the plain-weave areas is similar to the discontinuous- and the continuous-weft techniques described in sections 1.5.2. (technique *a*) and 1.5.3. (technique *d*) above, respectively.

Textiles of type 1.5.2. above are very similar; they are from the same cultural area (eastern Cakchiquel), and in a few cases are modern examples from the same town. The main points of contrast are the type of warp thread, fabric weight and balance, the complexity of background striping, the use or absence of selvedge stripes, and the degree of supplementary-weft patterning used.

1.5.5. Inconspicuous gauze stripes divide sections of plain weave patterned with single-faced supplementary-weft "knots." The two webs of this medium heavyweight and warp-predominant cloth are woven of white *hilo*. Three shots of gauze form horizontal stripes after each eleven rows of plain weave, and at first glance appear to be some sort of cording. Small colored wool supplementary-weft "knots" form a row at the center of each plain-weave section (see Fig. 28). The single historical example of this type (MARI 42–228) is a *huipil* collected in Jacaltenango in 1927.[18] It differs from the normal *huipil* of this community precisely in its incorporation of gauze picks; all other observed specimens—and those few pieces still being produced—utilize heavy weft cording to texturally stripe the fabric.

The completed textile offers no concrete evidence on how the gauze shed was picked up, but the low frequency of this shed (two out of every fourteen shots) suggests that this was probably done by hand rather than with the aid of a gauze heddle rod. The most likely weaving sequence is: (1) ten rows plain weave, ending with the shed; (2) countershed; (3) gauze shed; (4) countershed; (5) gauze shed. The weaver might have inserted a temporary shed stick in the gauze shed. This would have saved the work of picking up the gauze shed a second time in each gauze stripe, which would decrease the hand pickups to one shot in fourteen.

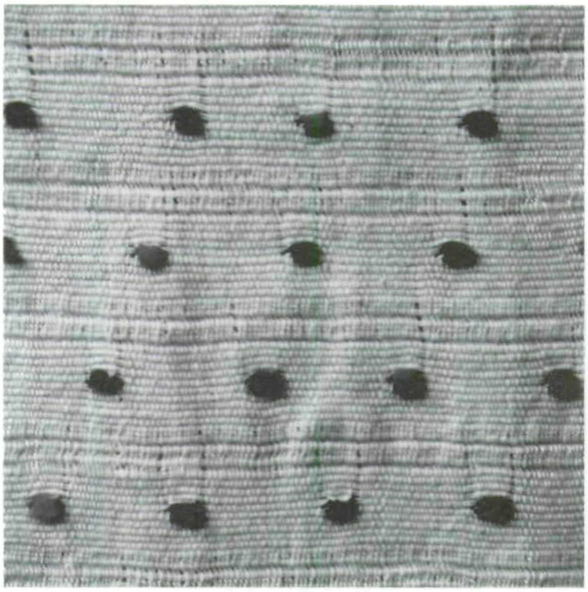


Fig. 28 Plain 1/1 gauze weave, in bands alternating with sections of plain weave patterned with supplementary-weft "knots." *Huipil*, Jacaltenango (MARI 42–228).

The supplementary-weft patterning appears in only one shot of each plain-weave section. The weaving sequence of these sections was: (1) six rows of plain weave, ending with the shed; (2) countershed, with short lengths of discontinuous extra weft wrapped around warp groups at 3.5–5 cm intervals; (3) shed; (4) countershed; (5) shed.

1.6. OVERALL PLAIN GAUZE (Figs. 16, 17). As generally produced in Guatemala, this variant is an extremely lightweight fabric used as a ground for supplementary-weft patterning or embroidery, and is treated below in sections 3. and 4. In addition, a single specimen of undecorated overall plain gauze has been observed.

This medium-heavyweight cloth was woven of *mish* (paired in the warp and tripled in the weft) in a pattern of brightly colored warp stripes on a red ground. The very closely spaced warp crosses create an effect of warp twining or crocheting (Fig. 17) rather than the lacy texture normally associated with gauze weaving. The single observed specimen (IXCHEL 3512) is a *gorra* from Santo Domingo Xenacoj, woven during the last decade. Several shots of 2/3 plain weave occur as a heading strip at either end of the piece, but the presence of only three selvedges suggests that two *gorras* were woven consecutively on the same loom and then cut apart.

The extreme regularity of the gauze crosses indicates that the textile was woven on a loom equipped with a supplementary heddle rod, although weavers from Santo Domingo Xenacoj also use unmodified looms for gauze weaving (compare description under 1.5.2. above). As there is no evidence to the contrary, it is assumed that the gauze shed was used in alternation with the shed—a standard practice in Santo Domingo—rather than the countershed/gauze-shed alternation practiced in most other Guatemalan communities. The weaving sequence would have been: (1) nine rows of plain weave, ending with the shed; (2) gauze shed; (3) shed; steps 2 and 3 repeated throughout the fabric, ending with another fifteen rows of plain weave.

2. Complex Gauze (Figs. 29, 30, 31)

In complex gauze structures, the warp ends are not interworked simply in pairs, but in more complicated sequences. As a result, warp and weft interlacings vary from one row to the next (in plain gauze both are 1/1 throughout). The technique which appears most commonly in Guatemalan textiles is complex alternating gauze; an unusual non-alternating complex gauze[19] is treated separately.

Guatemalan weavers use the most basic form of complex alternating gauze, in which the warps are grouped first in pairs and then in quadruples. The forming of the quadruples draws the warps together in bunches, which are arranged in alternate alignment (see Fig. 29), and give the textile a characteristic brick-like configuration. Two different gauze sheds must be formed to create the alternation. The first draws warps 1 and 3 around and above warps 2 and 4, 5 and 7 around 6 and 8, etc. The second draws 3 and 5 around 4 and 6, 7 and 9 around 8 and 10, etc. The weft interlaces the warps 2/2 in these gauze rows; in the intervening rows, the warps interwork in pairs rather than quadruples, and the weft interlacing is 1/1. The points at which the warps are interlaced by the wefts alternate from one row to the next.

The gauze sheds used to form complex alternating gauze may also be manipulated to form a non-alternating complex structure. In this case, the two gauze sheds are used one after another, followed by the plain-weave countershed. The effect of "bundles" created by complex alternating gauze is absent here; there is a random appearance to the thread interworking (see Fig. 31). The wefts interlace the warps 2/2, 2/2, and 1/1 in subsequent rows of this technique. Warps correspondingly interwork in quadruples, shifted quadruples, and pairs. In this structure, the points at which the warps are interlaced by the wefts are vertically aligned for two rows, then shift to alternate alignment in the third.

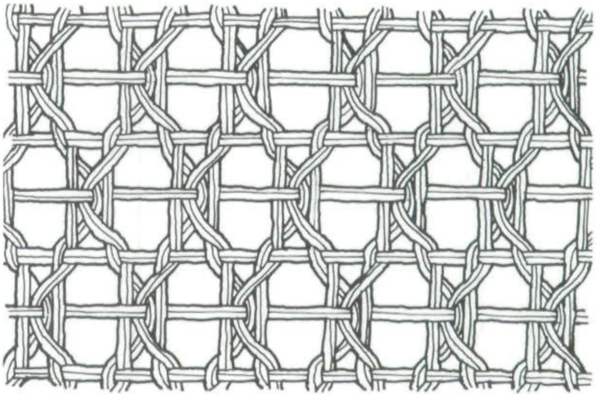


Fig. 29 Complex alternating gauze weave.

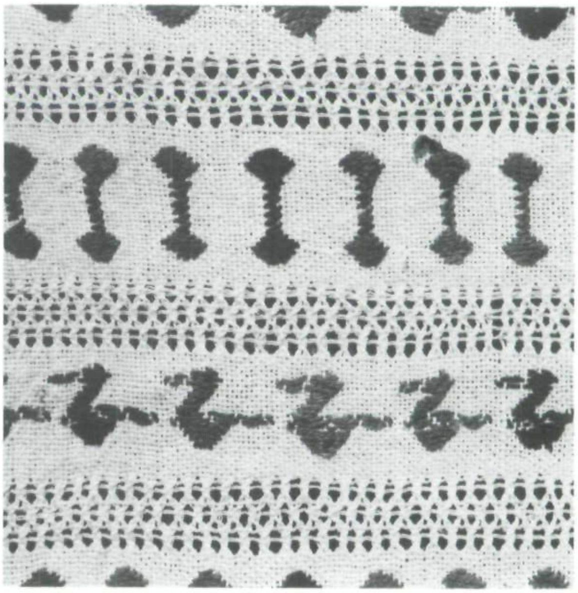


Fig. 30 Complex alternating gauze weave, in bands alternating with sections of plain weave patterned with supplementary wefts. *Huipil*, Senahú (IXCHEL 467).

Complex alternating gauze generally occurs in bands alternating with sections of supplementary-weft patterned fabric, but it was found in one instance as an overall fabric structure. Non-alternating complex gauze was used to form pattern bands in a supplementary-weft patterned cloth.

2.1. COMPLEX ALTERNATING GAUZE IN BANDS ALTERNATING WITH SUPPLEMENTARY-WEFT TECHNIQUES (Figs. 29, 30). In Guatemalan textiles, complex alternating gauze appears as bands interspersed with three types of plain-weave bands: (1) with extra-weft float patterning; (2) with laid-in supplementary-weft patterning; or (3) combinations of patterned and un-patterned plain weaves. Each is treated individually below.

2.1.1. Areas of complex alternating gauze are divided by strips of plain weave patterned with supplementary-weft floats. These medium-lightweight, balanced or slightly warp-predominant textiles are usually woven of *hilo* (paired or tripled in both warp and weft). The gauze sections are three to twenty-four shots in length; the intervening areas of plain weave measure 3–6 cm. These fabrics are from the Alta Verapaz region, and were woven as either *huipiles* or *servilletas*.[20] The former are composed of three long and narrow four-selvedge webs, while the latter are short, squarish webs with fringed ends. The *servilletas* and most *huipiles* woven prior to 1970 utilize a white ground with single-color or multicolor extra-weft patterning (see Fig. 30). *Huipiles* woven in the past decade are more likely to have a colored ground with a single contrasting color for the decoration.

The gauze areas are woven with the following weaving sequence: (1) countershed; (2) the warps are re-ordered by pulling on the shed roll, then the first gauze shed (formed by raising the first gauze heddle rod) is woven; (3) the warps are again re-ordered, then the countershed (plain-weave heddle rod) is woven; (4) warps re-ordered, then second gauze shed (raised by second gauze heddle rod) is woven; (5) warps re-ordered, then countershed again woven; the last four steps are repeated as necessary.

In each plain-weave section, discontinuous extra wefts are freely floated across the surface of the fabric to form a single row of motifs. The decorative threads cross and recross each motif area, and are carried across the same face between rows, resulting in a well-defined pattern on the front and no design on the back. The usual weaving sequence is: (1) one or more rows of plain weave, ending with the shed; (2) countershed, with the ends of the extra wefts laid in for anchorage; (3) shed: with the extra wefts carried across the motif areas, then passed under a warp pair or triple; (4) countershed, with the extra wefts turned on the face of the cloth and passed across the motif area and bound with a warp end; steps 3 and 4 are repeated as necessary, then followed by a row in which the extra-weft ends are laid in for anchorage, and one or more rows of plain weave. Additional warp binders are used to anchor particularly long floats; unusually short spans are anchored by wrapping the extra wefts back under the last warp end passed.

Different design motifs often appear in different pattern rows of *servilletas*, but *huipiles* generally utilize a single motif throughout the three webs. Popular motifs include human figures, birds, animals, and stylized flowers.

2.1.2. Areas of complex alternating gauze are divided by strips of plain weave with laid-in supplementary-weft patterning. White *hilo* (paired in both warp and weft) is used in a balanced, medium-lightweight cloth with very open gauzework. Sections of thirteen to twenty-one shots of gauze alternate with 3–4 cm of plain weave. The design is executed in a white-on-white "shadow weave," created by laying tripled extra wefts into every other row of plain weave. A single motif row is positioned in the center of each plain-weave band. These small, fringed webs are woven as *servilletas* in the Alta Verapaz region, and are a rare variation of the *servilletas* described in section 1.5.1. above.

The weaving sequence for the gauze sections is: (1) countershed; (2) first gauze shed; (3) countershed; (4) second gauze shed; (5) countershed; steps 2 through 5 are repeated as necessary. The shed roll is pulled forward to re-order the warps after each step.

The patterned bands are woven with the following sequence: (1) one or more rows of plain weave, ending with the shed; (2) countershed, with extra wefts introduced to form the laid-in motifs; (3) shed (extra wefts are not laid into this row); (4) countershed, with extra wefts carried up across the preceding row and laid in across the motif areas; steps 3 and 4 are repeated as necessary, then followed by one or more rows of plain weave.

A single design motif, often a bird, is generally used throughout. Two to six *servilletas* are woven consecutively on each loom set-up, with 6–10 cm of warp left unwoven between *servilletas* to serve as fringes when the webs are cut apart.

2.1.3. Areas of complex alternating gauze divide sections of both plain weave and extra-weft patterned plain weave. The dark blue ground of this weft-predominant, medium-lightweight textile is *hilo* (doubled in the warp and tripled in the weft). Strips of eight to twelve shots of gauze divide the plain weave into sections 1–1.5 cm long in the central portion, and 6–7 cm long at both ends. Each end section is patterned with extra-weft floats forming horizontal stripes with leaf-life appendages. The single historical example of this type is a *servilleta* from Panzós (SMITH 214349), accessioned in 1902.

The gauze sections were woven in the manner described in 2.1.1. above. Patterning was introduced with both continuous and discontinuous supplementary wefts. The former were used in each shot of ground weft as 3-span floats, anchored under single warps in alternate alignment to form horizontal stripes; the latter, as similar 3-span floats, applied to every other row of ground weft (which resulted in a vertical

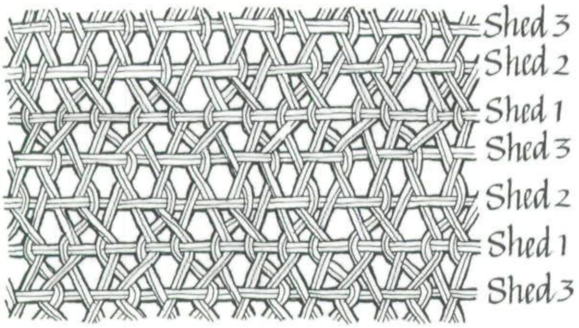


Fig. 31 Non-alternating complex gauze weave.

alignment of the floats) to form parallelogram segments.

2.2. OVERALL COMPLEX ALTERNATING GAUZE (see Fig. 29). This medium-weight and balanced fabric was woven of white *mish* (paired in both warp and weft), resulting in an open, lace-like texture unusual in Guatemalan textiles. The single observed specimen is a *huipil* from the Alta Verapaz region (Stewart 13).

The piece was woven on a loom equipped with three heddle rods, one controlling the countershed, and the other two picking up the gauze sheds. The weaving sequence was: (1) 2–5 cm of plain weave (which served as a heading strip), ending with the countershed; (2) the warps were re-ordered by pulling on the shed roll, then the first gauze shed was woven; (3) the warps were again re-ordered, then the countershed was woven; (4) warps re-ordered, then the second gauze shed woven; (5) warps re-ordered, then the countershed again woven; the last four steps were repeated throughout the cloth, followed at the end by another 2–5 cm of plain weave as a heading strip.

2.3. NON-ALTERNATING COMPLEX GAUZE (Fig. 31). Sections of non-alternating complex gauze divide areas of plain weave patterned with supplementary-weft floats. White *mish* in pairs or *hilo* in triples were used in a balanced weave for these medium-lightweight textiles. Six to nine shots of gauze alternate with 4–5 cm sections of plain weave which were patterned with a contrasting color. Only two specimens (M.NAC. 51138, M.NAC. 51137) have been observed. They are *huipiles* attributed to San Pedro Carchá and to Senahú, respectively, but there is reason to believe that both were woven by the same weaver from San Pedro Carchá.

The weaving sequence for the gauze sections was as follows: (1) countershed; (2) warps re-ordered by pulling on the shed roll, then first gauze shed woven; (3) warps again re-ordered, then second gauze shed woven; these three steps repeated as necessary. Extra-weft patterning was applied in the manner described under 2.1.1. above.

A stylized flower is the only design motif to appear in these *huipiles*. It was repeated to form a row in the center of each plain-weave segment.

3. Supplementary-weft Patterned Gauze (Figs. 32, 33, 34, 35)

Some plain gauzes are patterned with supplementary wefts, which are laid into the crossed-warp sheds (Fig. 32) or are passed over them in extra-weft floats (Fig. 34). In Guatemalan textiles, patterned gauze may form the overall fabric structure or may be incorporated as contrasting bands into a non-gauze construction.

3.1. OVERALL SUPPLEMENTARY-WEFT PATTERNED GAUZE (Figs. 32, 33). Two variations

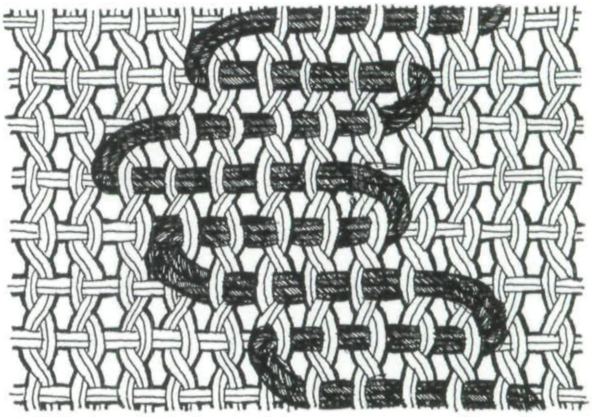


Fig. 32 Laid-in supplementary-weft patterned plain 1/1 gauze weave.

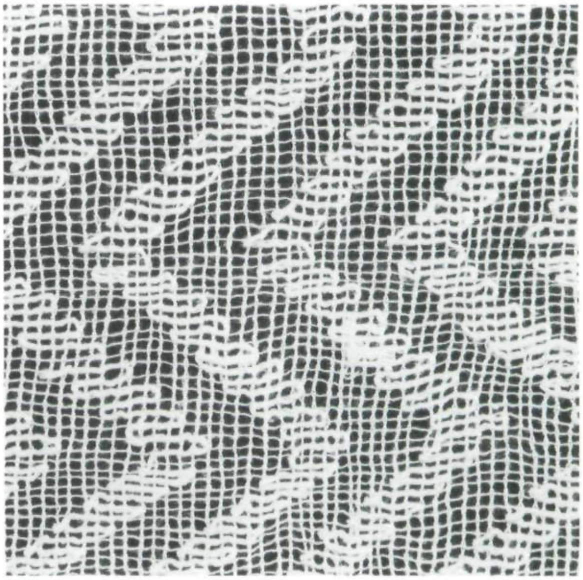


Fig. 33 Laid-in supplementary-weft patterned plain 1/1 gauze weave. *Huipil*, Alta Verapaz region (Pancake 17).

of this technique occur, the first a very lightweight white-on-white style with laid-in patterning, and the second a multicolor, medium-weight variety with two-faced weft-float patterning.

3.1.1. Laid-in extra wefts pattern a sheer, overall plain gauze. Textiles woven with a single threading are extremely lightweight and utilize white *hilo* or thin handspun cotton; those with paired warps and wefts are slightly heavier, and are always woven of *hilo*. Two or more strands of thicker single-ply thread form a white-on-white "shadow weave" design, usually of zigzags (Fig. 33). Completed pieces of this category are composed of three webs joined lengthwise to be worn as a *huipil*, and are from the Alta Verapaz region.[21] Some examples have finely-worked embroidery applied at the neck- and arm-holes. Although these *huipiles* are generally associated with the pre-World War II era, an occasional example still surfaces from time to time.

These fabrics are woven on looms in which a gauze heddle rod replaces the normal heddle rod. For the 3–5 cm of plain weave which serves as a heading strip at either end, the countershed rows are picked up by hand. The discontinuous supplementary wefts are laid directly into the shed openings of the gauze fabric. The weaving sequence is: (1) gauze shed (opened by the single heddle rod), with extra wefts laid in across groups of three to five warp pairs or triples to form the pattern; (2) shed, with extra wefts returned across the motif areas; these two steps alternate throughout the piece (see Fig. 32). Note that the gauze shed alternates with the shed, as opposed to the more normal gauze-shed/countershed procedure.

3.1.2. Extra-weft floats are incorporated in a two-faced design on a heavier gauze ground. Strands of red *hilo* are tripled to form the warp, which is broken by regular warp stripes of doubled *mish* in a variety of colors; wefts are of quadrupled *hilo*. The fairly open—no attempt was made to space the gauze crosses evenly—plain gauze creates a medium-weight cloth, patterned with occasional rows of single motifs. The single example (IXCHEL 3801) is a four-selvedge *gorra* from Santo Domingo Xenacoj, and is slightly lighter and more open than other gauze styles from that town (compare with sections 1.6. and 1.5.2. above).

Irregularities in the plain-weave heading strips indicate that this piece was woven on a loom in which a gauze heddle rod replaced the normal heddle rod. The plain-weave sections were woven with the countershed picked up by hand. Discontinuous supplementary wefts were introduced to form rows of motifs at intervals in the gauze weaving, and one row within the plain-weave heading strip. The weaving sequence of the gauze was: (1) three or more rows of plain gauze, alternating the shed with the gauze shed, and ending with the shed; (2) gauze shed, with the extra-weft ends laid in for anchorage, then passing over one to three warp crosses and under the next (in 2-, 4-, or 6-span floats), where needed to form the pattern, and passing through the fabric to the back where not needed for the design; (3) shed, with the extra wefts brought back forward from the back of the cloth and passed across the motif areas in the same type of spans; the last two steps repeated as necessary, followed by twenty-three more rows of plain gauze. Note that the gauze shed alternates with the shed as is found in other Santo Domingo Xenacoj textiles; however, this practice is in contrast to the more common gauze shed/countershed alternation. Rows of animals alternate with reversed curves to form the multicolor supplementary-weft patterning.

3.2. SUPPLEMENTARY-WEFT PATTERNED GAUZE IN BANDS ALTERNATING WITH PLAIN WEAVE (Figs. 34, 35). This lightweight, slightly warp-predominant textile of white handspun cotton alternates thirteen to twenty-one shots of gauze with 2–14.5 cm of plain weave. Silk extra wefts were used to decorate both the gauze and the plain-weave sections, the former utilizing a double-faced technique, and the latter both single-faced and laid-in patterning. The existing specimen (IXCHEL P–141) is a ceremonial *huipil* from San Martín Jilotepeque, dating from the late nineteenth century.

There is no evidence to indicate whether the gauze sheds of this historical textile were picked up by hand or raised with a supplementary heddle rod. The discontinuous extra wefts pass across the motif areas and then return in the same shot of ground weft, forming a double-faced design (Fig. 34). The weaving sequence was: (1) one or three rows of plain gauze; (2) countershed, with extra-weft ends laid in for anchorage, then floating to the right over one warp cross and under the next to form four floats on each face, then turning back under the last warp cross and reversing the interlacing, which ends one warp cross farther to the left; (3) gauze shed, with the same extra-weft treatment, ending with a short laid-in anchorage; (4) four rows of plain gauze, beginning with the countershed; steps 2 to 4 were repeated two or four times in each gauze band, followed by one or three more rows of plain gauze. The supplementary wefts form rows of small black, red-violet, and light blue

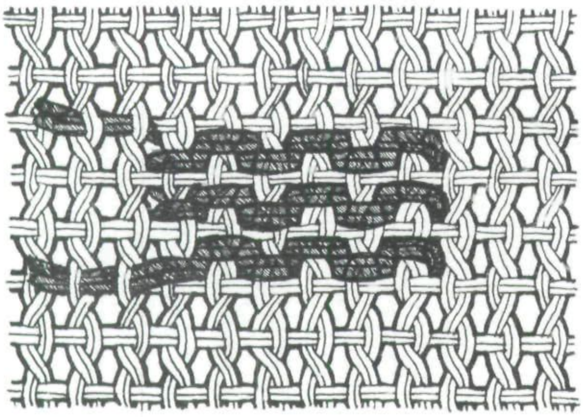


Fig. 34 Supplementary-weft floats patterning plain 1/1 gauze weave.

parallelograms in diagonal alignment (see Fig. 35); or five closely-spaced rows of rectangles in alternate alignment.

In the plain-weave areas, discontinuous and continuous supplementary wefts are laid in or form single-faced, weft-float patterning. Motifs include broken chevrons, serrate horizontal zigzags, and contiguous triangles in alternate alignment. Embroidered designs in red cotton were superimposed upon some of the supplementary-weft patterns.

4. Embroidered Gauze (Figs. 36, 37)

In addition to the supplementary-weft patterning just discussed, design elements may be introduced into plain-gauze constructions by embroidery. This type of decoration is accomplished after the gauze has been completed and removed from the loom. Only one

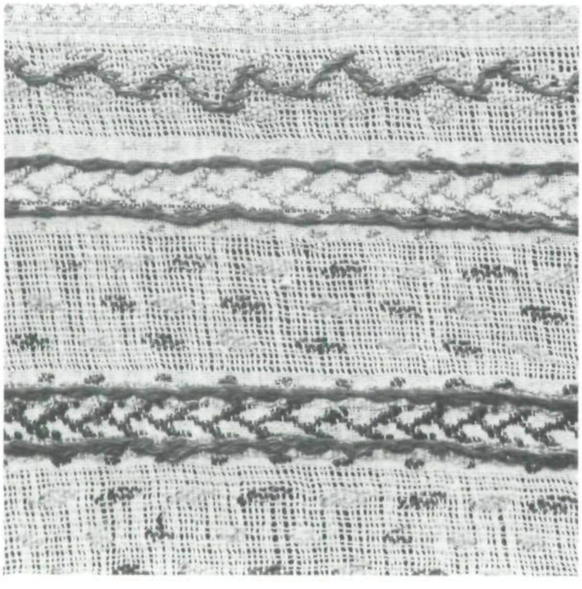


Fig. 35 Supplementary-weft floats patterning plain 1/1 gauze weave. *Huipil*, San Martín Jilotepeque (IXCHEL P–141).

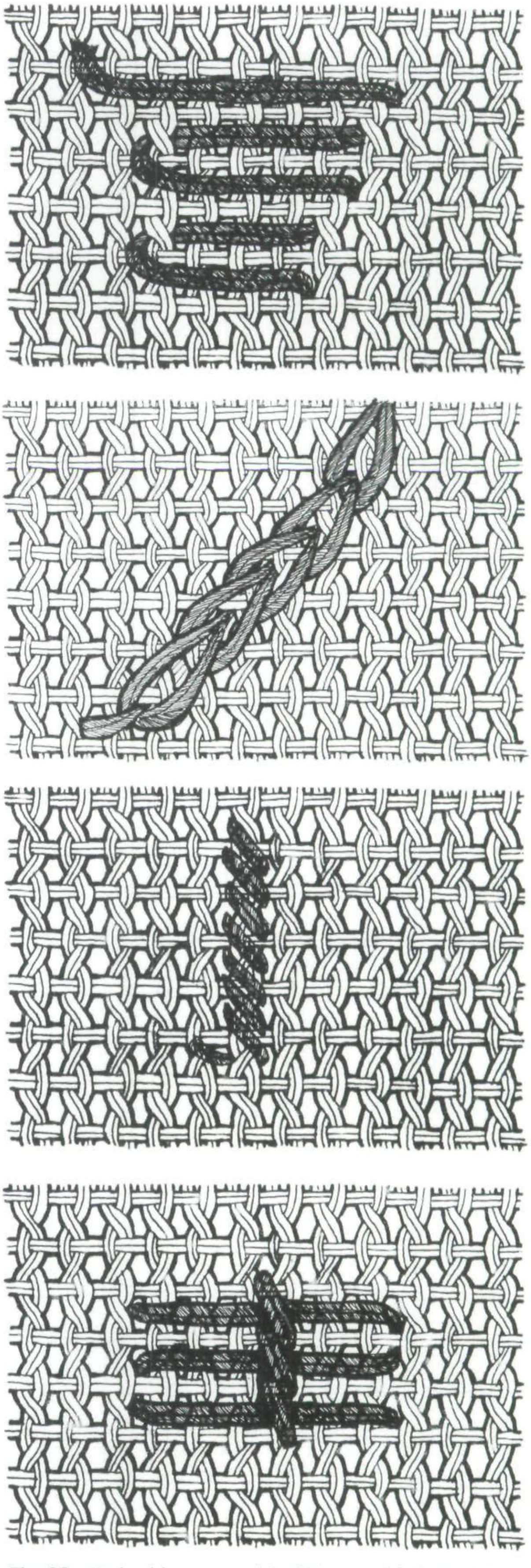


Fig. 36 Embroidery over plain 1/1 gauze fabric. (1) false-satin stitch; (2) chain stitch; (3) stem stitch; (4) couching of long straight stitches.

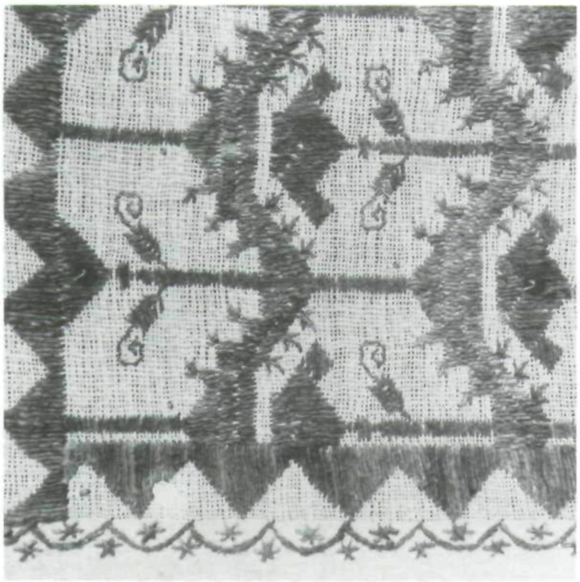


Fig. 37 Embroidery over plain 1/1 gauze fabric. *Huipil*, Mixco (IXCHEL P–75).

type of Guatemalan textile makes use of this technique.

4.1. EMBROIDERED PLAIN GAUZE (Figs. 36, 37). White handspun cotton was used to weave this lightweight, balanced textile, in which mauve handspun cotton was embroidered over plain gauze. The gauze sections measure about 40 cm in length, and were woven between large areas of plain weave. These plain-weave areas were patterned with "shadow stripes" of 1/2 cording as well as more mauve embroidery and occasional brass sequins. Only two historical examples of this three-web *huipil* are known to exist (IXCHEL P–74, M.NAC. 50501); both are from the town of Mixco and date from the nineteenth century. They were worn by ranking members of the *cofradías* (religious confraternities) for special ceremonial occasions.

Of the three webs joined to form each *huipil*, only the outer two include gauze sections. These are positioned to fall along the shoulders, and occupy about one-third of the webs' lengths. No clue exists as to how the gauze areas were woven. In the plain-weave areas of all three webs, a subtle patterning is provided by the use of six or eight shots of doubled wefts at regular intervals.

Mauve handspun cotton was used to embroider the upper portion of the *huipiles*. The embroidery was applied over both the gauze and the plain-weave sections of the outer webs, and over the plain weave of the central webs. In the gauze areas, false-satin, chain, stem, and straight stitches were used, with occasional French knots; some very long stitches were held in place by short couching stitches (see Fig. 36). The patterning is of geometric or very stylized floral motifs (Fig. 37).

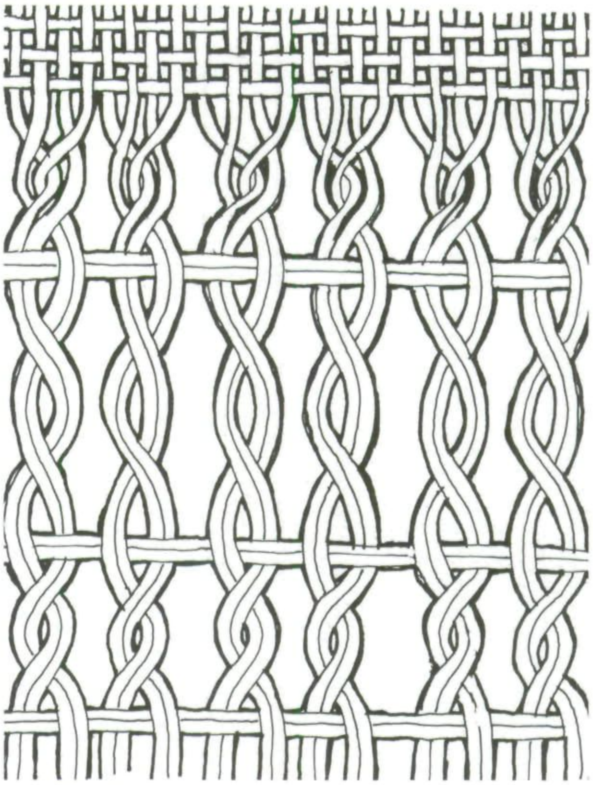


Fig. 38 Full-turn gauze.

The embroidery of the plain-weave areas is less formal and geometric. All the above-mentioned stitches were used, as were star stitch, buttonhole stitch, and long-armed cross stitch. On the outer webs, small stars and scallops outline the gauze sections; a few crude flowers are dotted below this band. The central panel is heavily embroidered with a variety of floral and foliage motifs, small stars, and a rough representation of a double-headed bird. A few brass sequins were applied over the embroidery.

5. Full-turn Gauze (Figs. 38, 39)

A singular open-work "fringe" was found in one historical specimen (Fig. 39). Since this structure shares characteristics with both warp twining and gauze, a concise description is difficult. A related structure has been reported in a handful of textiles from pre-Columbian Peru. It was first referred to as "irregular gauze,"[22] but has recently been redefined as "full-turn gauze."[23] The Guatemalan structure is presented here as a gauze variant because of its similarities with the ancient textiles, although these have added features not found in the Guatemalan example.[24] An accurate classification is made more difficult by the fact that this structure can be produced using either gauze- or twining-related methods.

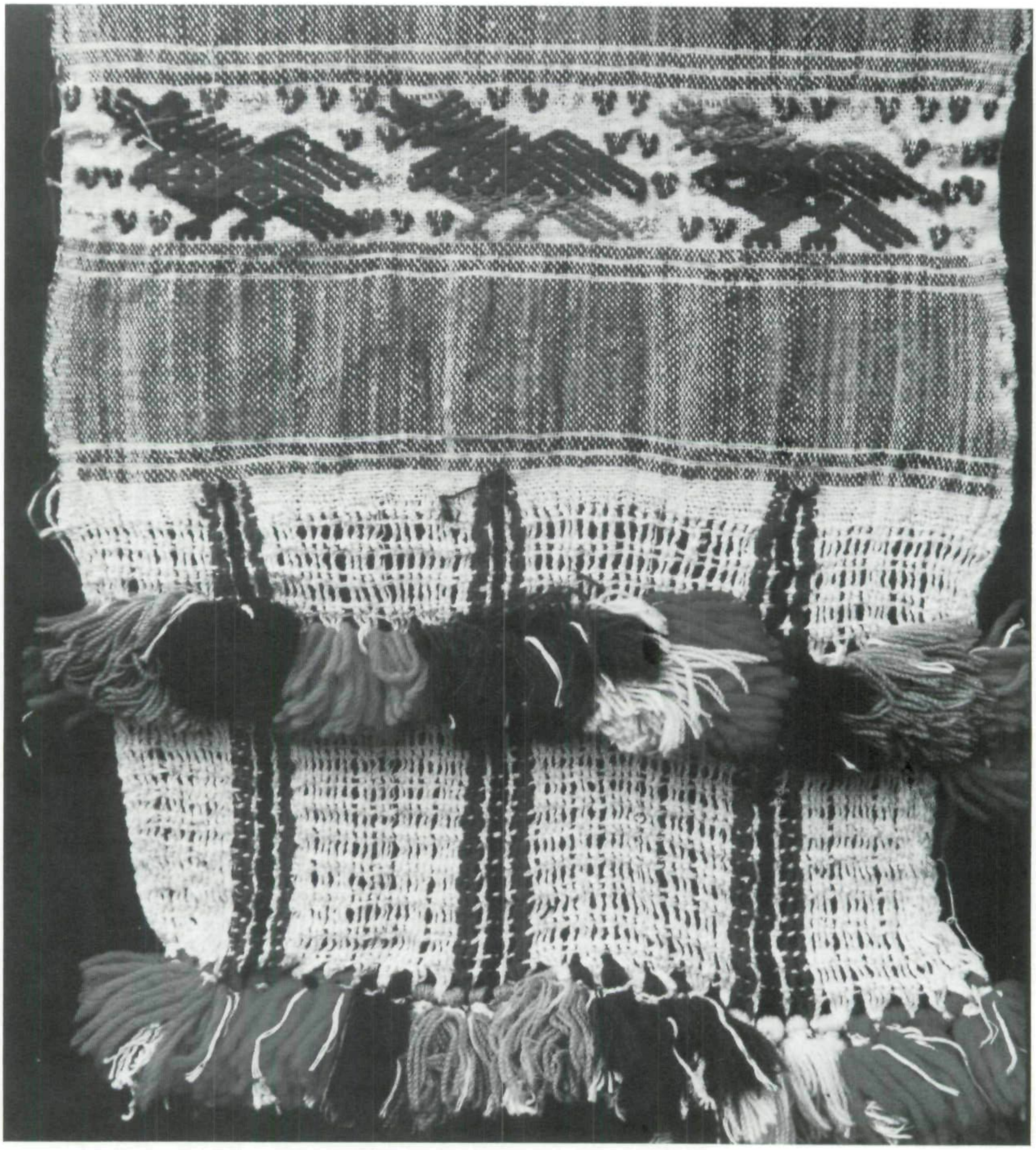


Fig. 39 Full-turn gauze. *Bufanda*, Palín (MARI 35–6627).

The structure of the Guatemalan piece demonstrates the very close relationship between full-turn gauze and a full-turn warp twining in which the direction of twist has been regularly reversed or "inverted."[25] In full-turn gauze the warp ends exchange their positions relative to one another by reversing the direction of crossing at regular intervals. One half of each interacting warp group crosses under the second half, is held by a weft, recrosses back under that half, then crosses on top of the second half, is held by another weft, and finally recrosses back over the second half. In the Peruvian textiles, two additional, nonholding wefts are inserted after each weft securing a warp cross. The use of numerous wefts gives visual definition to the crosses; they remain recognizable as the crossings and recrossings characteristic of gauzes in spite of their constant shifts in direction. However, the Guatemalan fringe treatment is less obviously related to gauze structures. Here, wefts are inserted only after every second crossing (i.e., only a third as often as in the sequence described above). This difference, although minor in terms of execution, results in a major

CULTURAL AREA	PLAIN GAUZE						COMPLEX GAUZE			SUPPLEMENTARY-WEFT PATTERNED GAUZE		EMBROIDERY OVER PLAIN GAUZE	FULL-TURN GAUZE
	single picks			in bands			alternating						
	alternating with plain weave	alternating with supplementary-weft patterned plain weave	forming checker with plain weave	alternating with plain weave	alternating with supplementary-weft patterned plain weave	overall (undecorated)	alternating with patterned and unpatterned plain weaves	overall (undecorated)	non-alternating	overall	in bands alternating with plain weave		
CAKCHIQUEL (Santo Domingo Xenacoj, San Antonio Aguas Calientes, San Pedro Sacatepequez, San Martín Jilotepeque)					C H	C				C	H		
CENTRAL POCOMAM (Mixco, Palín)												H	H
JACALTECA (Jacaltenango)					H								
KEKCHI (Coban, San Pedro Carcha, San Juan Chamelco, Senahú, Panzos, Lanquín)	C H	C	C	C	C		C H	C	C	C			
POCOMCHI (Purulhá, Tamahu)					C H								

Fig. 40 Summary of variant uses of gauze by the cultural areas in which they occur: C, current production in one or more communities; H, occurred historically but is now obsolete.

change in physical character. Between wefts, the warps are seen to spiral around each other, and the resulting fabric is more reminiscent of warp twining than of gauze.

The ambiguous nature of this structure[26] casts some doubt upon the appropriateness of its inclusion with Guatemalan gauzes. Although the technique may have evolved as an offshoot of normal gauze weaving, there is a notable absence of evidence of any intermediate developments such as structures comparable to the Peruvian examples. At the same time, it must be conceded that although sprang and weft twining techniques have been used in some areas of Guatemala, simple warp twining has not been found in any existing textiles. Whether this structure is more closely related to twining or to gauze antecedents—and which classification would best describe it—remains uncertain.

5.1. FULL-TURN GAUZE (Figs. 38, 39). A woven "fringe" is formed of warp groups which make a full turn around each other, are interlaced by a shot of weft, and then make a full turn in reverse direction before being interlaced by another weft. The unique "fringe" treatment was applied to 28 cm at each end of a long and narrow web, of slightly warp-predominant plain weave, woven of handspun white cotton and decorated with colored weft stripes and supplementary-weft patterning. The single specimen, a ceremonial *bufanda* (MARI 35–6627), was collected in Palín in the 1920's. Other examples of this garment utilize knotted fringe-work.

The two "fringe" areas occupy a total of approximately one-third of the textile's length. The warp ends were handled in quadruples, with two warps from the plain-weave shed paired to interwork with two from the countershed (see Fig. 38). Paired wefts were interlaced 1/1 to secure the changes in twist direction.

Long sections of warp, looped over the end bars of the loom, could have been left unwoven while the plain-weave area was being woven, and twined later after the piece was removed from the loom. However, considering the procedures used for other Palín textiles, it is more likely that the "fringe" was woven while the cloth was still on the loom, in the following manner: (*a*) heading strips woven on both ends; (*b*) one "fringe" section either twined or woven as full-turn gauze above the heading strip on one end; (*c*) plain-weave area woven above "fringe" section to within approximately 60 cm of second heading strip; (*d*) second "fringe" section woven; (*e*) piece removed from loom and heading strips cut off.[27]

The "fringe" could have been produced using either gauze or warp twining methods; there is no certain evidence to indicate which was employed. The full-turn gauze sequence would have been: (1) the rightmost pair of warps in each quadruple lifted under and around the pair on the left, and secured with a weft; (2) the warps returned to their original positions; (3) the left pair then pulled under and around its neighbor on the right and secured with another weft; (4) warps returned to their original positions; all steps repeated. The warp crosses in each row could have been raised by hand onto a pickup sword. Or, to facilitate the weaving, a gauze heddle rod could have been added to the loom to effect the crosses in one direction (with those in the other direction still formed by hand). In this case, it is likely that a supplementary shed stick was also added to maintain the order of the paired warp ends; it could have been drawn forward after each weft insertion to un-cross the warp pairs and return them to their original positions.

It is equally likely that a warp twining sequence was employed: (1) two pairs of warps spiraled clockwise for one full turn, then interlaced with a paired weft; (2) the same pairs twisted for a full turn in the opposite direction and held in place by another shot of weft; these steps repeated. If the twining was done off-loom, after completion of the plain-weave web, the warps could have been individually twisted and secured by the weft, as is normally the case in warp twining. However, if the areas were twined with a rigid (loom-held) warp, the sequence would have been modified: (1) temporary shed stick inserted to maintain the ordering of the warp in pairs; (2) each two pairs spiraled clockwise for one full turn and then slipped onto a pickup sword (which served to temporarily secure the twists); (3) pickup sword turned on its side to form an opening through which a weft was passed, then sword removed; (4) temporary shed stick pulled down close to the previous weft, an action which had the effect of un-twisting the warp groups (spiraling them in counterclockwise direction); (5) temporary shed stick turned on its side to form an opening through which a weft was inserted; steps 2 through 5 repeated.

It should be noted that a curious effect results from the relationship of the direction of twist of the individual warp ends to the direction in which the adjacent warps spiral around each other. The warps are Z-spun, and where they are twisted Z in the structure, the twist is naturally made tighter and subsequent wefts are relatively close together. When the structure twists in the S direction, on the other hand, the twist becomes looser and the wefts are farther apart (see Figs. 38, 39).[28]

Color was incorporated into the fringe area by the addition to the ground fabric of three warp stripes at approximately 15 cm intervals (see Fig. 39). The formation of each stripe required the addition of sixteen red and eight dark blue discontinuous warp threads at a point seven weft shots above the lower edge of the plain-weave cloth. The colored threads were interwoven in pairs into the ground fabric in the following sequence for each stripe grouping: four pairs red, four white warps (of the ground weave), four pairs dark blue, four white warps, four pairs red.

Colored woolen tassels were applied to each of the "fringe" sections in two rows, one at about 8 cm below the end of the plain-weave web, and the other at the terminal edge of the fringe. Groups of woolen yarns were inserted directly into the twined construction after every third warp twist, then tied to form the tassels.

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NOTES

1. All terminology is based on Emery's definitive work, *The Primary Structures of Fabrics*, The Textile Museum, Washington, D.C., 1966, reprinted 1980. Gauze weaves are treated under "Crossing and Recrossing" elements, pp. 180–87, 189–92.

2. A.G.M. de Escobar, *Técnicas Prehispánicas del Tejido*, Investigaciones XX, Instituto Nacional de Antropología e Historia, Mexico City, 1971, p. 85.

3. S.F. de Borhegyi, "Archaeological Synthesis of the Guatemalan Highlands," in *Handbook of Middle American Indians* (ed. R. Wauchope), University of Texas, Austin, 1965, vol. II, p. 16.

4. I.W. Johnson, "Hilado y Tejido," in *Esplendor del México Antiguo* (ed. C.C. de Leonard), Centro de Investigaciones Antropológicas de México, Mexico City, 1959, vol. 1, p. 457.

5. See L.M. O'Neale, *Textiles of Highland Guatemala*, Carnegie Institution of Washington, Washington, D.C., 1945, fig. 76a, for an example of a loom of this type.

6. A loom of this kind is illustrated in M.A. Alonso, "Exposición Diálogo con Motivo de la Celebración del 'Día del Aborigen,'" *Guatemala Indígena*, V:2(1970), p. 95.

7. O'Neale, *op. cit.* (note 5), p. 75, describes complex alternating gauze weaving with no loom modification—all gauze sheds are picked up by hand. However, in the experience of the authors, these constructions are always woven with supplementary heddle rods.

8. The following abbreviations are used in referring to collections: IXCHEL—Museo Ixchel del Traje Indígena, Guatemala City; M.NAC.—Museo Nacional de Arqueología y Etnología, Guatemala City; MARI—Middle American Research Institute, Tulane University, New Orleans; SMITH—Dept. of Anthropology, National Museum of Natural History, Smithsonian Institution, Washington, D.C.; TM—The Textile Museum, Washington, D.C.; Hempstead—private collection of Mrs. Lucie Smith Hempstead, Guatemala City; Stewart—private collection of Dr. Stephen Stewart, Antigua Guatemala; Elmenhorst—private collection of Charles Elmenhorst, Guatemala City; Pancake—private collection of the author.

9. O'Neale, *op. cit.* (note 5), p. 74, declares that the inclusion of gauze sections in a balanced, closely-spaced fabric "does nothing but lighten the texture and make the surface slightly rougher. To be effective, gauze crossings should be made with yarns which have some weight or are spaced to emphasize the shape of the openings."

10. Field interviews with women from Lanquín, 1977.

11. See L. de J. Osborne, *Indian Crafts of Guatemala and El Salvador*, University of Oklahoma, Norman, 1965, pp. 79d, 80c.

12. The authors define "single-faced" extra-weft patterning as that woven on an open shed and therefore appearing on only one face of the finished cloth; "two-faced" and "double-faced" patterns are woven on a closed shed and appear in different or identical configurations, respectively, on the two faces.

13. Alonso, *op. cit.* (note 6), p. 96.

14. For examples of this type of laid-in patterning, see: M. Anderson, *Guatemalan Textiles Today*, New York, 1977, fig. 164; M.M. Atwater, *Guatemala Visited*, The Shuttle Craft Guild, Basin, Montana, 1946, reprinted 1965 with added plates, p.26b; V. Birrell, *The Textile Arts; A Handbook of Weaving, Braiding, Printing and Other Textile Techniques*, New York, 1959, fig. 45; O'Neale, *op, cit.* (note 5), fig. 99b; Osborne, *op. cit.* (note 11), pp. 79c, 80d; L.E. Start, *The McDougall Collection of Indian Textiles from Guatemala and Mexico*, Occasional Papers on Technology 2, Pitt Rivers Museum, Oxford, 1948, fig. 14a. Similar items with weft-float patterning appear in Osborne, *op. cit.* (note 11), p. 91d; and C.N. de Rugg, *Diseños en los Tejidos Indígenas de Guatemala*, Guatemala City, 1968, pl.17.

15. See Osborne, *op. cit.* (note 11), p. 91d.

16. O'Neale, *op. cit.* (note 5), p. 74 and figs. 106–b1 and b2, erroneously refers to these pieces as *tzute* (carrying cloth) sections.

17. See Osborne, *op. cit.* (note 11), p. 201b for another example.

18. Just prior to the publication of this article, Ann P. Rowe reported a similar item, with five-shot gauze stripes, from the collection of the Peabody Museum, Harvard University. The authors look forward to examining the *huipil* section in the near future.

19. This structure is not included in Emery, *op. cit.* (note 1), but would probably be classified by her as a "variation of complex alternating gauze."

20. See examples in: H. L. Allen, *American and European Handweaving Revised*, Madison, 1939, fig. 65; Birrell, *op. cit.* (note 14), fig. 137; O'Neale, *op. cit.* (note 5), fig. 117c; Osborne, *op. cit.* (note 11), p. 84d.

21. See Osborne, *op. cit.* (note 11), pp. 3, 79a and b, 80a and b.

22. R. d'Harcourt, *Textiles of Ancient Peru and Their Techniques*, Seattle, 1974, p. 52; Emery, *op. cit.* (note 1), p. 187.

23. *Ibid.*, 1980 edition, pp. 187 and 341; A. P. Rowe, *Warp-patterned Weaves of the Andes*, Washington, D.C., 1977, p. 105, fn. 3.

24. The openness of the woven "fringe" contrasts dramatically with the dense weave of the Peruvian fabrics. More importantly, the Guatemalan example differs from the others structurally, since it incorporates only those wefts necessary to secure the warp crosses (see Fig. 38), and thus omits two-thirds of the wefts used in the Peruvian textiles. See Harcourt, *op. cit.* (note 22), fig. 31 and pl. 39C; Rowe, *op. cit.* (note 23), fig. 118 and const. 11. The Peruvian examples also counter the crossing direction of adjacent warp groups, but this feature will be ignored for the sake of brevity.

25. Compare Emery, *op. cit.* (note 1), pp. 197–99 and 206.

26. The equivocal character of the twining/gauze distinction has also been referred to by Rowe, *op. cit.* (note 23), p. 106: ". . .when change of direction is frequent, . . . there is an unanswerable question as to whether the crosses or the twists in the fabric are more important as far as classification is concerned." Compare the Guatemalan structure with Harcourt's diagramming of warp-twined and sprang constructions, *op. cit.* (note 22), figs. 38 and 39.

27. The two "fringe" sections could also have been twined, prior to the weaving of the plain-weave section, in a sequence similar to that used for sprang. Each row of twists would have been transferred simultaneously to both ends of the loom and secured with wefts. However, this would have necessitated the treatment of the plain-weave section as a four-selvedge web (the twined sections serving as heading strips),and a closure area would have been evident.

28. The authors are indebted to Ann P. Rowe, who pointed out the cause of the differential weft spacing.

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